Clarinet Hero: A Guide to Interpreting Electric Guitar Solos on Acoustic Clarinets

By

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Glossary

These are definitions for terms used throughout this project. They are not concrete. This fluidity will be discussed in the work itself.

classic rock[1]: A "retrospective designation" developed mainly by radio stations to refer to a format that "features album-oriented rock from the 1960s into the 1980s, with particular emphasis on music from the 1970s." Though it often features guitars, electric bass, drums, vocals, and keyboards, and songs often "evoke a certain nostalgia," the genre does not have "objective aesthetic standards; it was chosen by cultural gatekeepers who were searching for … a large, desirable target audience."

extended technique: Using an instrument to produce sounds in an unconventional or non-traditional way. (see "traditional technique")

hard rock[2]: "An imprecise term … referring to a group of styles originating in the late 1960s as a response to and development of the prevailing counter-culture." Hard rock has some overlap with heavy metal (see "heavy metal"), and often features "guitar riffs, power chords and boogie patterns largely from … blues-based playing."

heavy metal: A subgenre of hard rock music, separated from other blues-based rock by "more distorted guitar sound and heavier drums and bass." Heavy metal often features "power chords, heavy riffs, wailing vocals and virtuosic solos by guitarists and drummers."[3] "*Heavy* means loud, with the emphasis on the lower registers of the bass, and *metal* indicates the harder, sharper sounds of the solidbody electric guitar."[4] These "fuzzbox"-type sounds involve extreme distortion. "Heavy metal players took the power of electric amplification to its ultimate point."[5]

traditional technique: Mode of playing that aims at "the production of single sounds of similar tone colour throughout the compass of instruments, subdivided into semitones. … using a

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[1] All quoted passages are from Mickey Vallee, "Classic rock," *Grove Music Online*, July 25, 2013, accessed July 1, 2021, https://www-oxfordmusiconline-com.ezproxy.library.wisc.edu/grovemusic/view/10.1093/ gmo/9781561592630.001.0001/omo-9781561592630-e-1002240526.

[2] All quoted passages are from Allan Moore, "Hard rock," *Grove Music Online,* 2001, accessed June 30, 2021, https://www-oxfordmusiconline-com.ezproxy.library.wisc.edu/grovemusic/view/10.1093/gmo/9781561592630.001.0001/omo-9781561592630-e-0000046249.

[3] Robert Walser, "Heavy Metal," *Grove Music Online*, 2001, accessed July 1, 2021, https://www-oxfordmusiconline-com.ezproxy.library.wisc.edu/grovemusic/view/10.1093/gmo/9781561592630.001.0001/omo-9781561592630-e-0000049140.

[4] André Millard, after the collaborative paper with Rebecca McSwain, "Heavy Metal," in *The Electric Guitar: A History of an American Icon*, ed. André Millard (Baltimore: John Hopkins University Press, 2004), 164.

[5] André Millard, "Heavy Metal," in Millard, *Electric Guitar* 66.

single system of sound production."[6] In most cases, this refers to the way that Western European music was performed before the twentieth century. Specific to the clarinet, it uses "playing methods which keep to a single system of fingerings, and maintain one type of embouchure, while the method of blowing remains constant."[7]

international pitch notation: Also known as "scientific pitch notation," this is a system of notating pitches where "middle C" on a piano is "C4," the octave below is "C3," etc. The lowest note on an 88-key piano is A0, the highest note is C8. While the term is not specifically mentioned, this is the system of notation used in this study.

[6] Giuseppe Garbarino, *Metodo per Clarinetto*, trans. Reginald Brindle (Milan: Edizioni Suvini Zerboni, 1978), 2.
[7] Garbarino, *Metodo*, 3.

Abstract

Can an acoustic wind instrument like the clarinet perform electric guitar solos from the rock genre? Not just play the notes, but effectively achieve the same sounds and feel of an electric guitar? This project first looks at how performers of other acoustic instruments have tackled these questions, comparing their performances with the original guitar recordings. The research follows the history of electric guitar playing with a through line of "noise as expression." What follows is a comparison between most of the sounds and techniques available on the electric guitar—such as distortion, harmonics, bends, and picking techniques—and extended techniques on the clarinet, pulled from leading sources, tutorials, and personal experimentation. Multiple clarinet techniques are effective, such as multiphonics, double-tonguing, and various forms of vibrato and glissando. I use a combination of these techniques to create transcriptions with performance guides for five well-known guitar solos recorded in the final four decades of the twentieth century.

This investigation may make rock and heavy metal music more accessible to clarinetists. It also puts extended techniques in a context that may be more familiar to an average listener than other contemporary works written specifically for the clarinet. From a pedagogical standpoint, this encourages flexibility, technical prowess, and expression outside of what is usually asked of classical clarinetists.

Introduction

The clarinet is an incredibly versatile instrument. It has a huge dynamic range, and a pitch range of four octaves (four and a half on the bass clarinet). The range of colors and sounds it can get allows it to play a wide variety of genres including classical, jazz, klezmer, polka, Brazilian choro, and Hindustani classical music to name a few. From the 1960's to the present, performers and composers have also explored a variety of non-traditional sounds, or "extended techniques" (more on that terminology later), giving the clarinet an even wider range of expression. However, has the clarinet ever played rock music? Heavy metal? What about the thrilling electric guitar solos from these genres? *Can* an acoustic instrument like the clarinet play this music? This study explores the process of finding answers to these questions.

Outside of The Beatles and some Michael Jackson, my interest in rock and heavy metal music was limited as a child. I knew it was out there, but I did not actively listen to it. In my 20's, however, a friend introduced me to the video game *Guitar Hero*, and I was able to truly interact with this genre of music. I noticed the solos were complex, virtuosic, and expressive. Additionally, the things that helped define the sound of the electric guitar—pitch bending, distortion, harmonics, tremolo picking, and even power chords (to an extent)—sounded a lot like certain extended techniques on the clarinet.

Many books, articles, and dissertations have been written on the subject of extended techniques for the clarinet.[8] Some styles of music utilize them, such as jazz (vibrato, pitch bending, slap tonguing, microtones) or klezmer (glissando, growling), but I have not found any source that uses them in a hard rock context, and I have not seen any written transcriptions of guitar solos for

[8] See Bibliography.

clarinet that use them. I have only found a couple of clarinetists who have ridden that line, whom I will discuss later.

Why attempt to play this music on the clarinet? *Shakuhachi* player Cornelius Boots gave a thought-provoking answer, explaining, "It's 2018. A lot of the [guitar solos] you're talking about are half a century old, and there's no reason we shouldn't play them."[9] For younger players as well, "They shouldn't have a barrier to entry. There shouldn't be two worlds, where you have to say, 'I'm a classical player,' or, 'I like to play this rock stuff.' That should have been gone over 30 years ago."[10] One might ask, as bass clarinetist and professor at the San Francisco Conservatory Jeff Anderle did, "[Guitar players] are doing it electronically with a pedal, so you might as well just do it electronically with a pedal. Why suffer?"[11] I believe that these solos can present extended techniques in a new, and perhaps more familiar way, to clarinetists. The importance of teaching and learning extended techniques is addressed in the next section, but this repertoire could also be used as virtuosic showpieces of twenty-first century techniques, or even to break up a recital of other contemporary works. Bass clarinetist Harry Sparnaay advises, "There are dozens of fantastic [contemporary] pieces, but if you play them one after another the public needs help from a psychiatrist afterwards."[12]

My hope is that this study puts extended techniques in a context that may be more recognizable to an average student, performer, and listener than other contemporary works written specifically for the clarinet. These solos can encourage flexibility, technical prowess, and expression outside of what is usually asked of classical clarinetists. Similar to creating convincing drum sounds through beatboxing, there is also an impressive/virtuosic factor, and maybe the reason to play these solos can simply be for the reaction: "Wow, that's cool."

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[9] Cornelius Boots, phone interview by author, November 21, 2018.
[10] Boots, interview.
[11] Jeff Anderle, phone interview by author, November 16, 2018.
[12] Aad Van Nieuwkerk, "Harry Sparnaay and the Basklarinet Festÿn," *Clarinet* 41, no. 4 (September 2014): 80.

In Robert Walser's essay "Eruptions: Heavy Metal Appropriations of Classical Virtuosity," he describes a column in *Guitar for the Practicing Musician* that recommended studying Bach's violin music in order to (in Walser's words) "rise to its technical challenge."[13] Guitarist Eddie Van Halen started his musical life with piano lessons, developing his ear, and learning theory and technique.[14] Composers like Bach and Paganini influenced guitarists Richie Blackmore, Randy Rhoads, and Yngwie Malmsteen. The Great Kat is a Juilliard-trained violinist, and Malmsteen wrote a concerto for electric guitar and orchestra.[15] But what influence has rock music had on classical music? What can we learn from it that would require us to rise to *its* technical challenge?

A Pedagogical Approach to Extended Techniques

Many authors have written about the pedagogical benefits of learning extended techniques. Their rationale falls into two categories. First, that twenty-first century performers are more likely to be asked to play music that uses these techniques, and second, certain techniques can be an aid in mastering fundamental skills. The first reason is fairly self-explanatory, so the following sources discuss the techniques' pedagogical use.

Composer and clarinetist Eric Mandat wrote an article in *The Clarinet*, a magazine published by the International Clarinet Association, discussing how learning multiphonics can help get rid of "grunts," help obtain a "sotto voce" sound, help players more easily leap to third-partial notes, and maintain air support when playing soft.[16] Mandat writes:

> Flexibility does not imply a lack of stability, but rather the presence of stability at many different levels simultaneously. … The allowable variance in embouchure formation and wind pressure characteristics required to produce multiphonics is much smaller than that for normal notes. … It follows, then, that the right kind of practice on the right kinds of

[13] Robert Walser, "Eruptions: Heavy Metal Appropriations of Classical Virtuosity," *Popular Music* 11, no. 3 (October 1992): 290.
[14] Kevin Dodds, *Edward Van Halen: A Definitive Biography* (Bloomington, IN: iUniverse, 2011), 4.
[15] The full title is: Concerto Suite for Electric Guitar and Orchestra in E-flat Minor, Op. 1.
[16] Eric P. Mandat, "Expanding Timbral Flexibility Through Multiphonics," *Clarinet* 16, no. 3 (May-June 1989): 27-30.

> multiphonics will help increase timbral flexibility in more conventional contexts by increasing stability in making these more minute air and embouchure adjustments.[17]

Tiffany Valvo also wrote an article in *The Clarinet* with the specific title of "Refining Fundamentals through Extended Techniques." In this article she states that singing while playing "helps students understand legato air flow and correct voicing," practicing glissandos teaches "the possibilities of tongue motion … gaining flexibility and control," stopped and muted tonguing helps a student know which part of the tongue they are using on which part of the reed and with how much pressure, and multiphonics—in addition to Mandat's use for flexibility—"lead students to discover how little the fingers impact the note produced."[18]

Several graduate students have specifically addressed the pedagogical use of extended techniques in their dissertations. Olivia Meadows, Amy Humberd, and Caitlin Beare all discuss the importance of learning twentieth and twenty-first century techniques and address them in different ways from a pedagogical standpoint. Dr. Meadows commissioned five works for solo clarinet; four focus on a different technique each (notated rubato, the altissimo register, microtones, and multiphonics), and a fifth combines them all.[19] Dr. Humberd presents a method of teaching extended techniques to undergraduate clarinetists using a series of exercises, etudes, and solo pieces.[20] Rather than target a specific ability range, Dr. Beare's dissertation aims to provide any player "a gateway to learning contemporary clarinet techniques and literature," specifically multiphonics, microtones, and air sounds.[21]

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[17] Mandat, "Timbral Flexibility," 27.
[18] Tiffany Valvo, "Refining Fundamentals through Extended Techniques," *Clarinet* 47, no. 2 (March 2020): 34-36.
[19] Olivia Lauren Meadows, "A Program of Study for 21st Century Clarinet Techniques Featuring Five New Compositions for Unaccompanied Clarinet," (DMA diss., Arizona State University, 2019).
[20] Amy M. Humberd, "A Pedagogical Approach for Incorporating Extended Techniques into the Undergraduate Clarinet Curriculum" (DM diss., The Florida State University, 2020).
[21] Caitlin Beare, "Cultivating the Contemporary Clarinetist: Pedagogical Materials for Extended Clarinet Techniques," (DMA diss., University of Washington, 2021), abstract.

In her dissertation, Ariana Warren includes "Unconventional Sounds" in a description of her method for beginning clarinetists.[22] Warren adds another rationale for teaching these sounds/techniques: "to dissuade students from the idea that there are 'right and wrong', 'good and bad' ways of playing the clarinet."[23] In order to accomplish this, the method encourages students to experiment with "found sounds" on their clarinets.[24] Jeff Anderle does this with his university students as well:

> That's the nice thing about getting into extended techniques: every weird mistake you make is an extended technique that [a composer is] going to ask for. … Sometimes I have my students come up every week at their lesson with a new sound that they haven't made before, just to see: "What happens if you bite on it?" "What happens if you put the wrong fingers down?" "What happens if you squeak?" "What happens if you overblow?" just to know what happens, so that when you're getting [noodles/squeaks] you get some sort of weird thing, can you do it on purpose? Then once you can do it on purpose, you can *not* do it on purpose.[25]

Keep this willingness to experiment with new sounds in mind during the discussion of electric guitar innovators.

Several performers have written similar books for other instruments as well. Andrew Charles Gentzsch's 2019 dissertation "Technique Builders with a Pedagogical Approach to New Music Proficiency" was written for violinists. Stephanie Patterson's 2013 dissertation is titled, "An Approach to Contemporary Music Pedagogy for Beginning and Intermediate Level Bassoonists, Including Sixty-Four Original Etudes." Also for bassoon is Ryan Romine's 2019 book, *Bassoon Reimagined*. Flutist Robert Dick published a book in 2008 titled *Tone Development through Extended Techniques*. These are only a few examples of a concept that is becoming more popular on all instruments in the twenty-first century.

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[22] Ariana Warren, "21st Century Beginning Clarinet Method," (DMA diss., University of California San Diego, 2014), 10.
[23] Warren, "21st Century Method," 10.
[24] Warren, "21st Century Method," 13.
[25] Jeff Anderle, discussion with the author, Austin, Texas, November 16, 2017.

Supplementing all of this literature is my own experience with learning extended techniques. At the age of 14, after first hearing Larry Combs's glissando at the beginning of the Chicago Symphony's recording of *Rhapsody in Blue*, I asked my clarinet teacher if she could show me how to do this (at the time) seemingly impossible feat. I was fortunate to be able to learn it fairly quickly. During my undergraduate degree at Florida State University, Dr. Deborah Bish taught me how to further refine pitch bends, as well as exercises for harmonics (playing different notes using the same fingering by altering the oral cavity), how to circular breathe, how to double-tongue, and my first multiphonics. These techniques taught me how to have full control and command of the clarinet. It opened up new repertoire where fast articulation or breathing problems would have been prohibitive, and of course the ability to approach contemporary music without fear or having to start from scratch.

"Noise" as Expression

This phrase may call up the aesthetical philosophies of Luigi Russolo and John Cage, or the sociopolitical theory of Jacques Attali, and certainly portions of this study would fit in a discussion of these thinkers. What "'Noise' as Expression" means in the context of this project is sounds that are not necessarily "pure" or "pleasing" can still be expressive. This is not a new idea, and listeners of hard rock, heavy metal, and blues music would barely bat an eye at it, but it deserves discussion here for that exact reason. I find the fact that "after the 1960s and '70s, the exploration of new [extended] techniques fell somewhat out of fashion" counterintuitive with the fact that at the same time, experimentation on (and the popularity of) the guitar was building to a peak.[26] Recalling Mr. Sparnaay's comment about recitals of contemporary music potentially necessitating psychiatric help

[26] Matthew Burtner, "Making Noise: Extended Techniques After Experimentalism," *NewMusicBox*, March 1, 2005, accessed October 31, 2020, https://nmbx.newmusicusa.org/making-noise-extended-techniques-after-experimentalism/. Burtner adds, "To this day, extended techniques are often taught historically in music schools as merely endemic of 1960s experimentalism, or they are not taught at all."

on the part of the listener, why can someone listen to an entire album or concert of screaming, scratching, distortion, and feedback, and keep wanting more? Can studying the latter help us better understand the former? As Steve Waksman states in the final words of his book, "The electric guitar take[s] its place at the historical juncture between music and noise, as a device used to explore, challenge, and compose the systems of order and disorder, sameness and difference, that have constituted popular music in this century."[27]

In his biography of Jimi Hendrix, Charles Murray points out, "When he moved into his trick-bag, it was increasingly to express that which simply could not be communicated in any other way."[28] Before Hendrix,

> [Buddy Guy] used volume, feedback and other effects made possible by amplification to enhance his showmanship and draw attention to his mastery of his chosen instrument. Far from mere grandstanding, however, his use of such effects was the result of an aesthetic preference for sounds that cut against the grain of a smooth musical surface. At Newport, Guy's presence assumed the status of noise … In the broader world of American and British popular music during the 1960s, though, it was precisely this noise that guitarists used to forge new affective alliances between audiences and performers. [29]

In referring to Bo Diddley's playing, Charles McGovern states, "Electric bluesmen used the guitar to imitate elements of the natural and the industrial world."[30] Amiri Baraka notes the increase in overall volume in Rhythm & Blues music after World War II, commenting, "Somehow the louder the instrumental accompaniment and the more harshly screamed the singing, the more expressive the music was."[31] On the other hand, Baraka also comments, "Blues-playing is the closest imitation of

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[27] Steve Waksman, *Instruments of Desire: The Electric Guitar and the Shaping of Musical Experience*, (Cambridge, MA: Harvard University Press, 1999), 294.
[28] Charles Shaar Murray, *Crosstown Traffic: Jimi Hendrix and the Rock n' Roll Revolution* (New York: St Martin's Press, 1989), 194.
[29] Waksman, *Instruments,* 7.
[30] Charles McGovern, "The Music: The Electric Guitar in the American Century," in Millard, *Electric Guitar,* 33.
[31] Amiri Baraka, *Blues People: Negro Music in White America* (1963; repr., New York: HarperCollins, 2002), 171.

the human voice of any music I've heard."[32] He goes on to discuss Charlie Parker, whose sound at times was referred to as "raucous and uncultivated," but this was intentional: "Parker also would literally imitate the human voice with his cries, swoops, squawks, and slurs. … Parker did not admit that there was any separation between himself and the agent he had chosen as his means of self-expression."[33]

Later in his book *Blues People*, Baraka describes the "screaming" saxophone, describing contests where players would try to "screech, or moan, or shout the loudest and longest."[34] The contests' purpose was not mere posturing, but to deliberately play as "non-Western" as possible. "It was almost as if the blues people were reacting against the softness and 'legitimacy' that had crept into black instrumental music with the advent of swing."[35] Baraka is referring here to an essay by Hsio Wen Shih, who describes the homogenization of the blues by swing bands led by Benny Goodman, Artie Shaw, the Dorseys, Charlie Barnet, Earl Hines, Cab Calloway, Teddy Hill, and Chick Webb.[36] The electrified blues, therefore, was a micro-counterculture to the popular dance music of these bands that were eventually, in Shih's words, "impossible to distinguish one from another." Shih goes on to end his essay by saying, "By the early 1940's the gradual elimination of stylistic variations had killed big-band jazz. It was death by entropy."[37]

In other words, not only was noise a means of expression, it was a means to push back against the "standardization" of a style that was supposed to be, by nature, unique, irregular, experimental, vocal, and at times vulgar. I find this idea similar to one expressed by Eric Mandat in his aforementioned article from *The Clarinet*:

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[32] Baraka, *Blues People*, 28.
[33] Baraka, *Blues People*, 30.
[34] Baraka, *Blues People*, 172.
[35] Baraka, *Blues People*, 172.
[36] Hsio Wen Shih, "The Spread of Jazz and the Big Bands," in *Jazz: New Perspectives on the History of Jazz by Twelve of the World's Foremost Jazz Critics and Scholars*, ed. Nat Hentoff and Albert J. McCarthy (1959, repr., New York: Da Capo Press, 1975), 186.
[37] Shih, "Spread of Jazz," 187.

> One final thought: Two terms which many people use to favorably describe a clarinetist's playing that I find highly unfavorable are "solid" and "pure." When I think of something solid, I think of a brick wall: unmoving and unchanging. Certainly, then, it would be a greater compliment to be referred to as a "liquid" player than as a "solid" player (I think there have been more poems written about the beauty of the sea than about the beauty of brick walls). Now about purity: distilled water is pure, isn't it? If purity is the goal, why is something as "impure" as wine so much more costly and sought after?[38]

I would interject here that wine is still, for many people, generally pleasant to drink. I might take this a step further and ask, what if our story to the audience has water and wine, but also spoiled milk, strong bitter coffee, or ghost pepper hot sauce (or for that matter, gasoline)? What if music requires screams, and moans, and swagger, and humor, to be "rough and angry"?[39] Many classical musicians, perhaps clarinetists in particular, strive for the consistency and "purity" of sound that Mandat mentions, a constant worry about playing a "wrong" note or "bad" sound hovering over them like a dust cloud that could muddy that distilled water in an instant. But which approach is more likely to "forge new affective alliances between audiences and performers"?

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[38] Mandat, "Timbral Flexibility," 30.

[39] In an article on his piece entitled *Variants*, William O. Smith uses these adjectives to describe how one should play a trilling, descending glissando. "Master Class: Variants for Solo Clarinet." *Clarinet* 28, no. 3 (June 2001): 6.

I. Review of Existing Performers and Composers

Some authors have pointed out classical music's influence on rock. Janell R. Duxbury's series of discographies under the title *Rockin' the Classics and Classicisin' the Rock* gives multiple examples of one genre interpreting works from the other. Robert Walser's essay, later adapted as a chapter in his book *Running with the Devil,* took the first look at heavy metal from a musicological standpoint. Ken McLeod wrote about opera's influence on rock music.[40] Former *Guitar World* editor Brad Tolinski and contributor Alan di Perna mentioned the influence of eighteenth-century violinist Nicolo Paganini on Swedish guitar player Yngwie Malmsteen (born Lars Johan Yngve Lannerbäck), who "introduced classical scales and arpeggios to the rock world."[41] They also wrote about the Van Halen brothers' classical piano training as youths, and mentioned Eddie "winning trophies in local music competitions" on the instrument.[42] Eddie himself stated in an interview that he listened to "a lot of classical music, especially Debussy" (adding, "Goddamn, that mother wrote some hot shit!"), and thirty years later that he listened to Yo-Yo Ma because he loved the sound of the cello.[43] This is not by any means a complete list because my interest is in the influence going the other way.

The main task at hand, then, is to identify classical musicians who have played rock guitar solos. However, this already makes several assumptions, not without some level of musical "othering." Jeff Anderle brought up some of these challenges: "What is 'rock,' exactly? It's a broad, broad, broad genre. There aren't really 'classical' instruments anymore, either. The genre thing

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[40] Ken McLeod, "Bohemian Rhapsodies: Operatic Influences on Rock Music," *Popular Music* 20, no. 2 (2001), accessed July 11, 2021, http://www.jstor.org/stable/853651.
[41] Brad Tolinsky and Alan di Perna, *Play It Loud: An Epic History of the Style, Sound, and Revolution of the Electric Guitar* (New York: Doubleday, 2016), 251.
[42] Tolinsky and di Perna, *Play*, 240.
[43] Jan Obrecht, "Van Halen Comes of Age," in *Masters of Heavy Metal*, ed. Jan Obrecht (New York: Quill, 1984), 159; Chuck Klosterman, "Last Man Shredding," *Billboard*, June 27, 2015, 38.

becomes very problematic."[44] Classical and rock music and musicians can be pigeonholed or stereotyped, and in the twenty-first century neither genre is restricted to clear boundaries. Even the definitions in the glossary above include phrases like "imprecise definition" and "it often features…" My solution, perhaps an easy way out, is a 1998 article in *Guitar World* magazine titled "100 Greatest Guitar Solos of All Time."[45] It was entirely reader-submitted: "*Guitar World* asked its readers to jot their five favorite guitar solos on a postcard and mail it in to our offices. … Ultimately, only one pattern emerged: the guitar heroes of yesterday remain the guitar heroes of today."[46] The original "100 Greatest" article was replaced on guitarworld.com by a newer list in February of 2021.[47] This list is available in Appendix D, and is discussed later in this project. In 2011, *Guitar Player* magazine published an article titled "The 40 Most Influential Rock Guitar Solos," in which they listed their parameters: only electric guitar solos, only "rock" solos (though they did not specify how they defined "rock"), and only one solo per artist.[48] In this way, the readers of *Guitar World* and the staff at *Guitar Player* answer the question of "What is rock?" These lists are not without their problems, however, which I will also address later.

Looking through these selections, a better (though wordy) question may be, "What players of non-guitar acoustic instruments have attempted recreations of electric guitar solos from blues, hard rock, or heavy metal genres recorded between the years of 1958 and 1997 (the years bookending the 1998 *Guitar World* list)?" After researching several performers, I will analyze their approach, what worked, and what did not. Perusing Duxbury's selective (but extensive) discographies yielded several "pops orchestra"-style recordings, such as baroque takes on '60's rock

[44] Anderle, interview.
[45] See Appendix C.
[46] Nick Bowcott, Alan di Perna, Jeff Kitts, Alan Paul, Brad Tolinski, and Harold Steinblatt, "100 Greatest Solos of All Time," *Guitar World*, September, 1998, 57. For the full list, see Appendix C.
[47] *Total Guitar* editors, "The 50 Greatest Guitar Solos of All Time," *Guitar Word*, February 25, 2021, accessed July 11, 2021, https://www.guitarworld.com/features/the-50-greatest-guitar-solos-of-all-time.
[48] *Guitar Player* editors, "The 40 Most Influential Rock Guitar Solos," *Guitar Player*, June 2011.

tunes, or Beatles or Simon and Garfunkel songs done in a classical style. This was more or less the case with a Moscow Symphony Orchestra recording of Deep Purple's "Highway Star," but I did note that while they did not duplicate Richie Blackmore's guitar solo, the arranger used an arpeggiated figure from the solo in a unique way to build the arrangement.[49] A simple YouTube search for "guitar solo <fill in any acoustic instrument>" will yield results ranging from middle school band students playing a few bars to highly skilled performing artists' complete covers. I am more interested in the latter, though "highly skilled" is another subjective term. Using my best judgment and listening to many recordings and watching several YouTube videos, I found a number of performing musicians or groups who have done these solos, and another handful that have covered rock songs but do not quite fit the question above. In addition, I will discuss two groups that fit into an adjacent category of their own, and several composers who were influenced by hard rock and heavy metal.

Musicians Who Have Covered Guitar Solos

The first group of musicians I found play string instruments, a logical transition from guitar, itself a stringed instrument. In fact, the use of the cello in rock bands—or *as* a rock band—has garnered its own genre name: "cello rock." The most well-known heavy metal string group is in this genre: the Finnish heavy-metal cello quartet Apocalyptica, whose first album is a collection of Metallica covers.[50] It speaks to the virtuosity of Metallica's guitarist Kirk Hammett that Apocalyptica left the song "One" off of the album because they thought it was too difficult: "It's too fast … we didn't have enough good heavy-metal technique."[51] Their solution for the song "Master of Puppets" was to record the song, but leave the guitar solo out entirely. While not on the *Guitar World* list,

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[49] Moscow Symphony Orchestra, "Highway Star," *The Moscow Symphony Orchestra in Performane of the Music of Deep Purple,* Cromwell Productions, 1992, CD.
[50] Apocalyptica, *Apocalyptica Plays Metallica by Four Cellos*, Mercury 532.707-2, 1997, CD.
[51] Deborah Evans Price, "'They're Playing My Song,'" *Billboard*, October 31, 1998, 38.

"Enter Sandman" has a solo, and Apocalyptica plays a nearly note-for-note transcription. It is played accurately, but the vibrato and deliberateness of the rhythm do not have the same improvisatory feel of the original. Additionally, the cellist who plays the solo does not make an attempt to imitate the "wah-wah" pedal. This is understandable; I am not sure how they could.

They saved a recording of "One" for their second album, *Inquisition Symphony*, which is also a faithful transcription. In general, the style is wonderful, and the listener may have a hard time believing the sounds are only coming from four cellos. The soloist gets a rough, distorted sound, probably through a combination of the high range, significant bow pressure, and a close microphone placement. He also uses note bends and wide vibrato. The only place where the cellist strays from the feel of the original is at the beginning of the solo. In Metallica's recording, Hammett utilizes a technique called "tapping," which is a series of taps, "hammer ons," and "pull-offs" involving both hands on the fingerboard, each motion playing a pitch. In Hammett's case, the passage is done so rapidly that the notes do not really follow a measured pattern. In Apocalyptica's rendition, he has a stricter approach with straight, metered triplets. "Fade to Black" is also on that album, but they finish the song without the guitar outro.[52] After their first two albums, Apocalyptica featured more original compositions and fewer covers.

Two additional "cello rock" groups are the classically-trained Croatian duo 2CELLOS, and Break of Reality, a cello trio with percussion. Neither group covers a solo from any of the lists, though 2CELLOS recorded Guns N' Roses's "Welcome to the Jungle," the original featuring a solo by guitarist Slash (Saul Hudson). Sadly, they also skip over this solo in their rendition.[53]

I found two solo cellists who play in this style. The first is Tina Guo. While her recordings have a high production value, and stylistically she does a lot of the note-bending, glissandos, and intense playing that Apocalyptica does, she did not cover any songs from *Guitar World*'s list.

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[52] Apocalyptica, *Inquisition Symphony*, Mercury 558.300-2, 1998, CD.
[53] 2CELLOS, *2CELLOS*, Sony Music, 2011, CD.

Additionally, on songs that have solos like "Iron Man" by Black Sabbath, and "Raining Blood" by Slayer, she uses an electric cello, not an acoustic one.[54] The other cellist is Aaron Minsky, aka "Von Cello," whom I discovered on Janell Duxbury's website, rockclassical.com. In a video on Von Cello's YouTube channel, he plays Jimi Hendrix's "The Star-Spangled Banner" followed by Hendrix's "Purple Haze." The anthem loosely follows Hendrix's original, including playing "Taps" between the B and C sections, though he saves most of the rocket and bombing effects that Hendrix plays in the B section for the C section. He plays them on his lowest string with heavy bow pressure. He also gets the "feedback" effect on the final note of the B section by moving the bow closer to the bridge ("sul ponticello"). In "Purple Haze," he plays the solo pretty close to Hendrix's original, with glissando slides along the string.[55] Note: In other versions of "The Star-Spangled Banner" on his channel, Minsky uses a pickup and pedal effects.

Violinist Rachel Barton Pine is a classically-trained violinist and Chicago native who played with the Chicago Symphony when she was only 10 years old.[56] With her "band" of two violins and cello, Stringendo, she released an album of all heavy metal and classic rock covers in 1997, titled *Storming the Citadel*.[57] The solos she covered from the *Guitar World* list were Metallica's "Fade to Black" and "One," Led Zeppelin's "Stairway to Heaven," and Nirvana's "Smells Like Teen Spirit." The opening solo from "Fade to Black" is a direct transcription for violin. In the second solo, she has the benefit of being able to use double-stops to play the harmonies. The final solo sounds like it is her own improvisation, but uses glissandos, chromatic note figures, and rapid arpeggiation similar to the original. She does her own solo in "Smells like Teen Spirit" as well, using mostly pentatonic

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[54] Tina Guo, *Cello Metal*, Tina Guo Music, 2015, CD.
[55] Aaron Minsky, "Hendrix Tribute Live in Seattle! Von Cello (Anthem/ Purple Haze)" (video of live performance), posted August 23, 2015, accessed July 18, 2021, https://youtu.be/qS3X5XgASqg.
[56] Crocker, "Rachel Barton Pine."
[57] Rachel Barton, *Stringendo: Storming the Citadel*, recorded May 29-30, June 25, and July 13, 1997, Cacophony, 1997, CD.

scales with glissandos. This solo is more active than the original, in which Kurt Cobain simply plays the melody he has sung in the verses. Barton Pine's "Stairway to Heaven" is a strict transcription, but uses traditional violin technique with some extra bow pressure and glissandos. In the 9th and 10th bar, Barton Pine alters the rhythm slightly and leaves out the bends that give the original its bluesy feel. It sounds a little too traditional at that point. Finally, we have "One," which is another note-for-note transcription. Pine actually plays the tapping section with more abandon than Apocalyptica, and is less accurate with her fingers, thus actually making her rendition more authentic to the original. On this recording, she typically plays everything up an octave from the guitar originals. This "range issue" will be discussed in Chapter V. (Note: Her version of the Star-Spangled Banner on this album is not an imitation of Hendrix's, but very violinistic, like an encore piece.)

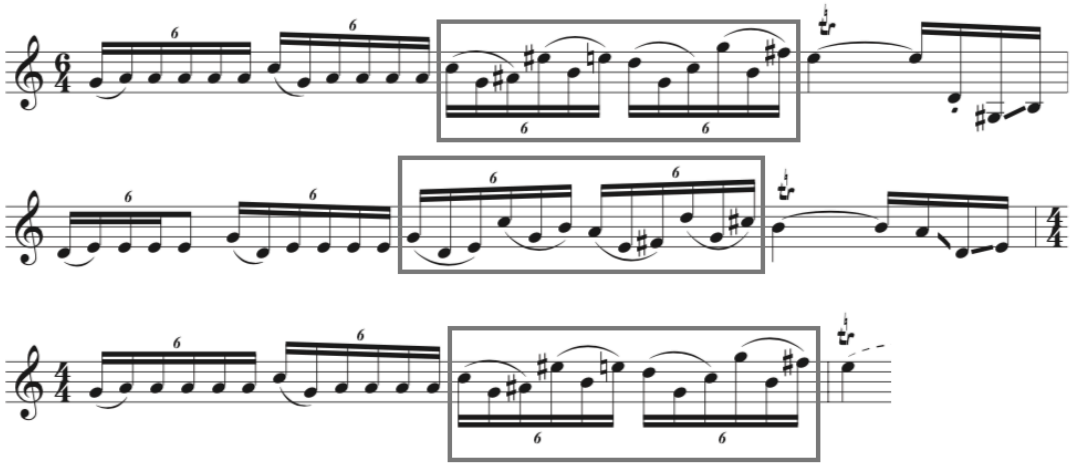
Nigel Kennedy is an English violinist who also started his career as a classical musician, but has also played jazz, klezmer, and in 1999 released an album of reinterpretations of Jimi Hendrix songs, titled *The Kennedy Experience*.[58] They are mostly longer, and depart from originals. The solos he plays are not based on Hendrix's solos, but use double and triple stops and several harmonics and bow scratches to create distortion. The two solos that are on *Guitar World*'s list are "Little Wing," which substitutes a more ethereal slow ballad for Hendrix's dry picking and glockenspiel. The other solo is "Purple Haze," which is played in a style reminiscent of a bluegrass band.

Another violinist is Bobby Yang, whose mission is similar to that of this project: to play guitar solos, "acoustically, without pedals or effects."[59] In his words, "You don't really feed [feel?] the big picture if you're plugged in and amplified. It's hard to be objective about the exact sounds you're making."[60] On his album *Yang It! Live at Eddie's Attic*,[61] he tackles Eddie Van Halen's

[58] The Kennedy Experience, *The Kennedy Experience,* Sony Classical SK 61687, 1999, CD.
[59] Bobby Yang, "Bobby Yang: Movement for the Wooden Violin," accessed July 18, 2021, http://www.bobbyyang.com/bio/.
[60] David Templeton, "Rough n' Shreddy," *Strings* 20, no. 4 (November 2005): 53.
[61] Bobby Yang and his Unrivaled Players, *Yang It! Live at Eddie's Attic*, Unrivaled Records, 2006, CD.

"Eruption," "the solo that transformed rock guitar … one minute and twenty-seven seconds of exuberant and playful virtuosity."[62] Yang achieves many of the same effects as the guitar, and often in a similar way. He plays the "power chords" as triple-stops. He accomplishes the bends and vibrato with glissandos along the fingerboard. He rapidly bows to achieve the tremolo picking effect, and uses artificial harmonics and sul ponticello to get the "pinch harmonic" effect (though often in places where Van Halen did not play a pinch harmonic, an artistic decision on Yang's part). For the famous tapping section in this solo, he simply fingers while bowing, changing bows every triplet. The violin is a little aggressive here; the tapping sound of the guitar is clean and "glassy," whereas Yang is really scrubbing away at the strings, giving his performance an even more distorted sound than the original. For the "vibrato bar dives" (aka "tremolo bar dives" or "whammy bar dives") that go down to the lowest octaves of a piano in the original, he simply jumps up an octave for the material before it so he can continue to glissando down. At an extremely detailed level, in Van Halen's recording, after the bar dive all the way down to concert D1, Van Halen plays a lightning-fast figure in sextuplets (Figure 1). This is one of the more harmonically complex moments of the solo, but Yang plays a much simpler scalar passage here.

Figure 1. Van Halen's "Eruption," mm. 18–20.[63]



[62] Walser, "Eruptions," 271.
[63] Written pitch; sounds one octave plus one half-step lower.

Yang also covers "Welcome to the Jungle," and he does play the solo. As with Eruption, stylistically Yang uses stops, glissandos, and harmonics to great effect. As with the passage above, he simplifies a few spots. The final solo he plays is on Van Halen's "Hot for Teacher," and it sounds like a solo he is improvising. It is full of slides, tremolos, harmonics and fast notes, but it actually loses something in the virtuosity. Eddie Van Halen's solo is more "singable," for lack of a better word.

Another performance of "Eruption" on violin is available, played by Jill (ジル) from the Japanese speed metal band Unlucky Morpheus. Note-wise, it is more accurate than Yang's rendition (she plays the material from Figure 1) but uses fewer harmonics and less sul ponticello. She uses octaves to represent the sound of the guitar's overtones, and in general has a cleaner sound. This serves her in the tapping section where she achieves more of the guitar's "glassy" tone. For the bar dives, she uses a similar octave-jumping solution to Yang.

The Hampton String Quartet's website refers to the group as "the original all classic rock string quartet."[64] Between their albums, they have covered eight of the songs from *Guitar World's* 1998 list. However, only three of their renditions have the guitar solos in them: "Stairway to Heaven," "Aqualung" by Jethro Tull, and another Led Zeppelin song, "Heartbreaker." All three songs, while accurate note-wise, sound like traditional classical violin playing. The original solo in "Aqualung" is distorted with fast, nervous vibrato. The violinist in the HSQ plays it politely. In "Heartbreaker," he misses some of the slides that give the solo its soulfulness, and is also a little too "accurate," similar to Apocalyptica's tapping section of "One."[65] In "Stairway to Heaven," many of

[64] John Reed, "The Hampton Rock String Quartet," accessed December 18, 2018, https://monalisasound.com/hsq/.
[65] Hampton String Quartet, *Take No Prisoners,* Mona Lisa Sound, 2011.

the technical passages are simplified, though he does a great job in bars 9 and 10, the bars where Barton Pine lost the feel.[66]

An extremely well-known string quartet, in the classical world at least (if their two Grammys are any indicator), is the Kronos Quartet. They closed their eponymous album (their sixth studio album, but the first for Nonesuch Records) with an arrangement of "Purple Haze."[67] Violinist David Harrington's solo resembles Hendrix's original, but strays from it several times. My first reaction was that it also sounds too traditional, with Harrington playing tremolos and glissandos, and a couple of notes in unison on two strings to get a bit of a "distorted" sound. He does not do much else to make it sound like an electric guitar. However, I am not sure that was their goal. In an interview with UniVibes magazine, Harrington commented, "For me it was just, hey, this guy was a great musician, 'I love this—let's do it!' It was really simple … you absorb all kinds of different music in your life and some of it really reaches deeply into your life and that's the music that stays with you the most."[68] His violin may not sound much like Hendrix, but the performance is full of passion and the spirit of the original.

I came across one more quartet, the "Vitamin String Quartet." Their website describes them as being "based in Los Angeles," featuring "a rotating cast of musicians and producers."[69] Personnel appears to change from album to album, and their website implies that the common thread between albums is simply that they are all owned by the Vitamin label. They have several albums (173 at the time of this writing), including full-album tributes to specific artists. Some of the albums have tracks that overlap. Of the nine that have songs from the *Guitar World* list, only five albums have songs with some kind of guitar solo section.

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[66] Hampton String Quartet, *Sympathy for the Devil*, Dolphin Records 702, April 30, 1993, CD.
[67] Kronos Quartet, *Kronos Quartet*, recorded June, 1985, Nonesuch Digital 79111-2, 1986. CD.
[68] UniVibes, "Kronos Quartet on Jimi," *UniVibes: International Jimi Hendrix Magazine,* September 13, 1994, 37-38.
[69] Vitamin String Quartet, "What is VSQ?" 2021, accessed July 17, 2021, https://www.vitaminstringquartet.com/pages/about-us.

Possibly due to the personnel changes, the solos are handled differently on each album. *VSQ Performs Songs from Guitar Hero* contains improvised solos (little to no resemblance to the original) for Metallica's "One" and The Smashing Pumpkins's "Cherub Rock." The solo in Lynyrd Skynyrd's "Free Bird" is cut short, and only uses a few bends, but the solo in "Sweet Child of Mine" by Guns N' Roses is fairly accurate, trading from one violinist to another when the guitar solo trades, but they alter the ending as the two violinists come together. The change gives it a more virtuosic effect perhaps, but both players still play with a traditional classical approach to the violin.[70] *VSQ Performs Jimi Hendrix* contains "Purple Haze" and "Little Wing." The former has bends, vibrato, and a harsher sound, and the two violins play it in octaves to imitate the range of harmonics in Hendrix's guitar sound. "Little Wing" is more traditional playing, the solo is harmonized then repeated with a violinist playing it solo, but each version is simplified (only 10 bars each). They did include the glockenspiel in the recording, though.[71] In the solo from "One" on *Say Your Prayers Little One: VSQ Performs Metallica* (different than the one from *VSQ Performs Guitar Hero*), the two violinists play in unison and octaves for the same reason above. It is a bit slow, the solo is cut short by about 12 bars, the opening tapping is done in slow triplets, and they do nothing else to sound like a guitar. The solo on "Fade to Black" is not the same, it sounds improvised, but played in the right style, with tremolos, slides, and harmonics. The beginning of the solo from "Master of Puppets" is played in parallel fifths for four measures followed by octaves for four measures. These eight measures are repeated up a step, and the solo ends there (only covering half of the original solo).[72] *VSQ Master*

[70] Vitamin String Quartet, *VSQ Performs Songs from Guitar Hero*, Vitamin Records, 2008, downloadable album, accessed July 19, 2021, https://www.vitaminstringquartet.com/products/vsq-performs-songs-from-guitar-hero

[71] Vitamin String Quartet, *VSQ Performs Jimi Hendrix,* Vitamin Records, 2003, downloadable album, accessed July 19, 2021, https://www.vitaminstringquartet.com/products/the-string-quartet-tribute-to-jimi-hendrix.

[72] Vitamin String Quaret, *Say Your Prayers Little One: VSQ Performs Metallica*, Vitamin Records, 2011, downloadable album, accessed July 19, 2021, https://www.vitaminstringquartet.com/products/say-your-prayers-little-one-string-tribute-to-metallica.

Series: Pink Floyd's Dark Side of the Moon has the songs "Money" and "Time." "Money" is recreated accurately, and the soloist plays with bow pressure, glissandos, and double stops to produce the sound. The solo is cut about 25 measures short, however. The players use their instruments in creative ways to create convincing sounds of a cash register and adding machine at the beginning of the track, as well. In "Time," the soloist only does some bends, but David Gilmour's original solo is likewise fairly mellow.[73] Lastly, *VSQ Performs Queen* has the whole guitar solo from "Bohemian Rhapsody," played in a mostly-traditional style with a few bent notes.[74]

As a plucked instrument, the harp can get certain sounds similar to the guitar. The Harp Twins are a harp duo of identical twins Camille and Kennerly Kitt. Classically trained at the Wheaton College Conservatory of Music, they are perhaps most famous for their covers, from heavy metal classics to video game music. Similar to Bobby Yang, they believe in creating arrangements playable by "only our 2 harp parts - but no backtrack, loops, overlays, studio, etc. That way we can play everything 'live' exactly as you see in our videos."[75] They have covered several of the same songs seen so far, but usually skip the guitar solo. In "Fade to Black," one of them plays a simplified version of the first 14 bars of the solo.[76] "Enter Sandman" and "One" also have simplified, shortened solos.[77] They explain this in a reply to a comment on their version of "Crazy Train" by

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[73] Vitamin String Quartet, *VSQ Master Series: Pink Floyd's Dark Side of the Moon*, Vitamin Records, 2003, downloadable album, accessed July 19, 2021, https://www.vitaminstringquartet.com/products/vsq-master-series-vsq-performs-pink-floyds-dark-side-of-the-moon.

[74] Vitamin String Quartet, *VSQ Performs Queen*, Vitamin Records, 2004, downloadable album, accessed July 21, 2021, https://www.vitaminstringquartet.com/products/the-string-quartet-tribute-to-queen

[75] Camile and Kennerly, reply to comment by Sir Flopsalog, May 19, 2015 (1:59pm), on "OZZY OSBOURNE - Crazy Train - Harp Twins (Camille and Kennerly) HARP METAL" (music video), reply to a comment, posted July 28, 2014, accessed July 19, 2021, https://youtu.be/BR2RVaXKQiE.

[76] Camile and Kennerly, "METALLICA - Fade to Black (Harp Twins) Camille and Kennerly" (music video), posted October 31, 2017, accessed July 19, 2021, https://youtu.be/GiWG_KNFFgo.

[77] Camile and Kennerly, "METALLICA - Enter Sandman (Harp Twins + Drums) Camille and Kennerly" (music video), posted January 26, 2017, accessed July 19, 2021, https://youtu.be/ORu4jcidXno; Camile and Kennerly, "METALLICA "One" - 2 Girls 1 Harp

Ozzie Osbourne that asked why they did not play the guitar solo: "We cover every part of the solo that is possible on harp. :) :) Harps cannot 'shred' or riff. … Harps are not chromatic instruments. To get chromatic pitches we have to flip levers - one lever for each string."[78]

On the other hand, Michelle Kwan, a Chinese *guzheng* player, has a few videos of rock and pop covers on YouTube. Another plucked instrument, the guzheng is not far from the guitar, either, but it is also built to pitch-bend significantly. Kwan's transcription of Metallica's "One" comes close to the original, though she falls into the triplet trap at the beginning that Apocalyptica fell into. Kwan uses three-finger-picking to simulate the extremely fast tapping technique of Hammett.[79] Her solo on "Sweet Child of Mine" is faithful to the original.[80] The bending she does sounds almost exactly like Slash. The relative similarity to the guitar, however, is likely responsible for this accuracy of sound. She does use a distortion pedal in "Sweet Child," but it is barely noticeable, and the main gestures of the solo come from her skill on the instrument.

In looking specifically for woodwind players, I found the flutist Edwin Rist, who goes by Edwin Reinhard on YouTube. He did an all-flute overdubbed recording of Metallica's "Master of Puppets." He does play the guitar solo in its entirety: after playing the rapid passages at the start, he uses double-tonguing to imitate the "tremolo picking" of the guitar. He flutter-tongues during another rapid passage. He does not do anything to distinguish the bends, specifically the "unison bends" that end the solo.[81]

(Harp Twins) HARP METAL" (music video), posted August 29, 2015, accessed July 19, 2021, https://youtu.be/JhOhGhq0e54.
[78] Camile and Kennerly, "Crazy Train."
[79] Michelle Kwan, "Metallica – One (Guzheng Cover)" (video by artist), posted September 23, 2014, accessed July 19, 2021, https://youtu.be/TNn-iUT6xh4.
[80] Michelle Kwan, "Guns 'N Roses - Sweet Child o' Mine - Guzheng Cover" (video by artist), posted September 21, 2013, accessed July 19, 2021, https://youtu.be/YO6sFdoklVU.
[81] Edwin Reinhard, "Master of Puppets (Metallica) – Rock Beatbox Flute" (music video), posted October 8, 2012, accessed July 19, 2021, https://youtu.be/dO80dgra5C0.

Melissa Keeling has a solo flute version of "Eruption" that departs from the original to the extent that it is hard to recognize at times, but as a solo piece for flute it is extremely effective.[82] She uses effects pedals, but only occasionally to provide reverb. Other effects she uses are harmonics, singing while playing, and a sliding "glissando headjoint" developed by flutist Robert Dick, with whom Keeling studied.

Cornelius Boots began his musical life as a clarinetist, switching to bass clarinet and finally to the *shakuhachi*, a Japanese longitudinal end-blown flute. He was interested in styles of music other than classical, studying jazz at Indiana University with David Baker, and playing both electric bass and bass clarinet in rock groups before founding Edmund Welles, a "heavy metal" bass clarinet quartet. His YouTube channel has several covers of rock songs performed on the shakuhachi, one of which is "Purple Haze." Boots' solo (truly "solo;" most of his covers are unaccompanied) starts similar to Hendrix's, but quickly veers into its own direction as Boots improvises using pitch bends, grace notes, tremolos, arpeggios, and a unique technique of rubbing his fingers up and down the instrument over the holes, which gives an impression similar to "tremolo picking" on a guitar.[83] It also has a visual effect that would certainly be flashy on stage. The shakuhachi can bend pitches significantly, in either direction:

> We can do so many pitch slides and turbulent breath distortion effects that aren't actually possible [on other instruments], only singers, slide-guitarists, theramin players, trombonists, and shakuhachi players can do them. In terms of just a simple whole-step pitch slide, that's not easy to do fluidly [on other instruments]. Once you're up on the high register on bass clarinet it's quite easy, but only from underneath.[84]

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[82] Melissa Keeling, "Eruption - Van Halen (arr. Melissa Keeling, flute)" (music video), posted September 10, 2017, accessed July 19, 2021, https://youtu.be/u5BgyNE7U_8.
[83] Cornelius Boots, "Jimi Hendrix 'Purple Haze'--Solo Shakuhachi, arranged and performed by Cornelius Boots 尺八" (video of private performance), posted April 3, 2018, accessed July 19, 2021, https://youtu.be/kf71SOFhgWQ.
[84] Boots, interview.

Now we have finally arrived at the clarinet. Cornelius Boots also played the guitar solos from Iron Maiden's "Hallowed Be Thy Name" with Edmund Welles. While it is not on the "100 Greatest Guitar Solos" list, it deserves a closer look, especially since Mr. Boots did such an accurate transcription and performance of it.[85] He uses nearly the full range of the bass clarinet, from sounding D2 to A5, and uses pitch bending, trills/tremolos, and screaming high notes to sound like Dave Murray and Adrien Smith's guitar solos. I also interviewed Edmund Welles member Jeff Anderle, who said, "Iron Maiden works pretty well, because it's about speed in the solos," meaning they did not have to do a lot of extra effects and techniques.[86] This solo is fairly straightforward in terms of playing the notes, but it is impressive all the same.

In terms of virtuosity, one would have a hard time finding a more virtuosic clarinetist than Gleb Kanasevich, who lives in New York and is a member of Ensemble Cantata Profana. His classical YouTube channel features performances of some of the most challenging contemporary repertoire for the clarinet, but he also has a separate channel under the name Caleb Canatheviphth where he performs death metal covers on the clarinet and bass clarinet. His introduction to metal music happened when he was a teenager: "At the Belarus State Conservatory in Minsk, most of my classmates in a class of 13 or 14, everyone but maybe one was listening to metal at the time, so basically, I grew up around a bunch of classical kids who were into heavy metal of some sort."[87] When he got to Yale University for his graduate work, he felt "basically tied to the orchestra, where you really can't miss an orchestra rehearsal for any reason," and boredom started to set in. To take a break during scale warmups, he would play along with recordings of metal bands like Necrophagist and Decapitated. His roommate at the time filmed one of these play-alongs, "and he wakes me up one morning and says, 'I don't know how to say this to you, but I put a video of you playing the

[85] Edmund Welles, *Imagination Lost*, Zeroth Law edmundwelles4, 2011, CD.
[86] Anderle, interview.
[87] Gleb Kanasevich, phone interview by author, December 11, 2018.

little snippet of Decapitated's "Spheres of Madness" on YouTube without asking you, but I gotta come clean now because it has 300,000 hits.'"[88] Apparently it happened over the course of only two or three days.

Kanasevich also has not recorded any solos from *Guitar World*'s list, but he has recorded a few solos from songs by Necrophagist, whose lead guitar player Muhammed Suiçmez plays some stunningly virtuosic solos. I listened in particular to the (literally) viscerally-named "Fermented Offal Discharge,"[89] and noticed pitch-bending, fast vibrato, and double-tonguing to replace the guitar's tremolo picking. He also uses different types of "flutter tonguing" to simulate tremolo picking, "Especially if it's a tremolo that is not exactly rhythmicized, I usually just do really violent flutters. … Depending on the context and depending on the music, I learned how to roll in a different place—it can be on the reed, slightly off the reed, toward the back of my throat—so it can be gentler or stronger depending on the musical context."[90]

The final example does not precisely fit into any category. #87 on *Guitar World's* list is guitarist Vernon Reid's solo from "Cult of Personality" by Living Colour. Vernon Reid later recorded a solo album called *Mistaken Identity* that included among its personnel jazz clarinetist Don Byron. Vernon Reid founded the Black Rock Coalition in 1985, and Byron was a board member. Byron plays on five tracks on this album. On "You Say He's Just a Psychic Friend," Byron plays the melody with the guitar, and only a discerning listener can tell that there is a clarinet playing; it just colors the guitar. In his solo (the only solo on this track; there is no guitar solo), he plays with some distortion: playing loud and growling while playing, not being afraid to squeak (which he does). Throughout the album he plays a motive while descending in half steps, which is common on the guitar where simply moving the fretting hand up or down a fret simplifies this melodic technique. I

[88] Kanasevich, interview.
[89] Gleb Kanasevich, "Necrophagist - Fermented Offal Discharge (clarinet cover WITH SOLO)" (video by artist), posted January 31, 2013, accessed July 19, 2021, https://youtu.be/50vL1uAXn7s.
[90] Kanasevich, interview.

will note that this is much more challenging on the clarinet, where each transposition requires all different fingerings. In "The Projects," Byron plays the bass clarinet, and uses the blues scale throughout his solo. In "What's My Name," Byron harmonizes the guitar melody, and again it is difficult to tell that the clarinet is playing (and not just the guitar playing double-stops) until Byron breaks away from Reid. Byron plays an up-tempo solo and squeals on a high concert G6. Three tracks later is "My Last Nerve," another bass clarinet feature. Byron plays bebop-inspired lines, plays a written A6 (concert G5), and amuses the listener by quoting the circus cliché "Sabre Dance" from Aram Khachaturian's ballet *Gayane* to finish his solo.

By this point in the album, the following song, "Freshwater Coconut," sounds like the clarinet and bass clarinet are playing harmony with the guitar, but at this point it is just the guitar. The timbres of the clarinet and guitar blended so well earlier in the album that the ear expects it. In the final song, "Mysterious Power," Byron plays some interludes, but no full solo. *Mistaken Identity* is an example of the clarinet as a jazz instrument being used in a rock band. The following section explores traditionally classical instruments used in rock bands.

Classical Instruments Used in Rock Bands

Arguably the most famous wind-playing rock musician is Ian Anderson, the lead vocalist and multi-instrumentalist in the British rock band Jethro Tull. He started out playing electric guitar, but after hearing Eric Clapton perform, "it became obvious that he would be a tough act to follow, so I looked for an instrument that he couldn't play. On an impulse, I bought a Selmer Gold Seal flute, which was portable, shiny, and about fifty dollars."[91] Anderson often played flute with Jethro Tull, using it as a lead melodic instrument instead of the guitar. He had to be picky with the type and placement of the microphone, because "the flute doesn't fit happily in the midst of electronic

[91] Victoria Jicha, "Jethro Tull's Ian Anderson," *Flute Talk* 24, no. 6 (February 2005): 7.

combatants."[92] Out of creative and practical necessity, he discovered his own techniques for how to sound like a guitar. Both for volume as well as confidence, he learned to sing and play the flute at the same time, a technique that he employed often. Singing a note in unison with the flute gave him "the bravery to trade phrases with the guitar and drums."[93] After learning to play the *bansuri*, an Indian transverse flute with open holes, he realized that "players can bend pitches and play quarter-tones and slides easily because of the absence of keys. That experience caused me to switch to open-hole flutes so I could play slides on them as well."[94]

The other band that uses classical instruments in a rock context is, of course, the Electric Light Orchestra. The seeds of the band started when songwriter/guitarist Roy Wood invited singer-songwriter Jeff Lynne to join his band The Move. A fan of George Martin's string sound in Beatles songs like "I Am the Walrus" and "Strawberry Fields," Wood had already begun thinking, "Wouldn't it be great if you could represent this on stage properly? With your own band—like instead of having a guitarist, have a cello player or a French horn player and not have to use sessionmen."[95] While recording *Message from the Country*, Wood and Lynne were playing around in the studio, and Wood "played these Jimi Hendrix riffs to [a backing track] on the cello. Jeff said it sounded great, so I went into the studio and put about 15 of them on, and it sounded like some heavy-metal orchestra."[96] This became the Electric Light Orchestra's first release, "10538 Overture," and spawned the genre of what would later be called "cello rock." That first album had five musicians playing combinations of cello, double bass, oboe, bassoon, clarinet, recorder, bass clarinet,

[92] Jicha, "Jethro Tull," 10.
[93] Jicha, "Jethro Tull," 9.
[94] Jicha, "Jethro Tull," 8.
[95] Thompson, Dave. "Electric Light Orchestra." *Goldmine Magazine*, April 28, 2006, 15.
[96] Thompson, "Electric Light Orchestra," 16.

krumhorn, timpani, French horn, hunting horn, piccolo trumpet, and violin. Jeff Lynn commented, "That's what [the] album is about, using strange instruments (to us) and getting new ideas."[97]

The standard line-up for most of their albums included the typical guitar, bass, keyboard, and drums, plus violin and two cellos. Most of their albums also included an orchestra backing them up. Relevant to this discussion, the Electric Light Orchestra recorded a cover of Chuck Berry's "Roll Over Beethoven," which cut in portions of Beethoven's Fifth Symphony, and had an electric-guitar-like violin solo utilizing several of the techniques already discussed, in once case doing a major-second double-stop glissando while doing a tremolo with the bow.[98]

Composers Influenced by Rock

This is a category tangentially related to this project but is useful because it includes several clarinetists and bass clarinetists. In his article "The Bass Clarinetist as Composer," Jonathan Russell mentions that one of San Francisco-based Aaron Novik's biggest influences is the metal band Meshuggah. The article notes that rock is an important influence on Beth Custer, and Michael Miller states, "Death metal always crops up in any piece I am writing, sometimes subtly and sometimes blatantly, usually the latter." Expanding on what was previously mentioned, Cornelius Boots's compositions draw on just about every genre there is, but perhaps most noticeably from heavy metal and rock bands like Tool, Melt-Banana, and Fishbone.[99]

In the clarinet world, perhaps the most notable example of this influence is in the music of Scott McAllister, an American composer and clarinetist. Almost all of McAllister's compositions for clarinet are inspired by non-classical genres. McAllister explains the reason for this, saying, "My number one goal is to have the performer play my music with passion and tap into his or her own individuality. I often tell performers if they don't squeak, splat or miss a few notes then they really

[97] Thompson, "Electric Light Orchestra," 16.
[98] Electric Light Orchestra, *Electric Light Orchestra II*, United Artists Records UA-LA040-F, 1973, LP.
[99] Jonathan Russell, "The Bass Clarinetist as Composer," *Clarinet* 41, no. 4 (September 2014): 68.

are not playing my music. … A lot of music needs to be performed on the edge."[100] Regarding his concerto for clarinet and wind ensemble titled *Black Dog: Rhapsody for Clarinet*, he stated his own inspiration by Jimi Hendrix: "I saw a video of Hendrix playing some outdoor concert and I wondered: 'Why can't we go to a concert and see a soloist (clarinetist, pianist, somebody) playing with that passion?' … Seeing the vein in Jimi Hendrix's head, and the sweat pouring everywhere—I want to see a clarinetist like that on stage involved in my music."[101] While he seldom directly quotes guitar solos (and when he does, it is only for a measure or two), his goal is to get the right style and show their influence.

His first work that included these influences was a concerto simply titled *X* (for Generation X). The work "was inspired by builders that were building a house next door to me. They were cranking Nirvana and Alice in Chains all day. I decided to improvise with the music and that is what inspired *X* and the beginning of my 'new' style."[102] Grunge bands similarly inspired his following work for saxophone quartet and wind ensemble titled *X2. X3* for clarinet, violin, and piano also contains grunge material and references to "Smoke on the Water" by the band Deep Purple.

In *Black Dog*, McAllister wanted to get away from the grunge genre and focus more on the "guitar hero" persona: "His clarinet solo lines emulate Jimi Hendrix's guitar playing and are supported by Led Zeppelin-esque rhythms and compositional form."[103] *Black Dog* was written for his former teacher (and mine) at Florida State University, Dr. Frank Kowalsky. In fact, I was in the audience for the premiere of *Black Dog*, conducted by the peerless James Croft, and recall it bringing

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[100] Amanda McCandless, "An Interview with Scott McAllister," *Clarinet* 35, no. 1 (December 2007): 63.
[101] Christopher James Money, "The Clarinet as Guitar Hero: A Study of Rock Music Influences in Scott McAllister's *X, X²*, and *Black Dog*" (DMA diss, Florida State University, 2007), 35. This is perhaps a bit of a romanticized image. Perusing live footage, I was unable to find any where a vein was visible in Hendrix's head. On the contrary, he seems calm and focused during his performances (not to mention most of the time he wore a headband).
[102] McCandless, "An Interview," 62.
[103] Money, "Clarinet as Guitar Hero," 77.

the house down and receiving a standing ovation. Dr. Kowalsky is a modest man, but he truly wailed that evening. However, his approach to the piece was fairly straightforward, perhaps with a small amount of vibrato in places. When Robert Spring first heard the concerto performed, his reaction was, "The idea, the sounds, the effects and the drive of this piece were simply more than I ever thought could be done on the clarinet!"[104] When he recorded the work three years later, he took a more aggressive approach than Kowalsky:

> I began to think of the piece as a huge guitar solo, a mixture of Jimi Hendrix and "The Star-Spangled Banner" going into "Purple Haze," as it was at Woodstock, and the amazing Jimmy Page guitar solos with Led Zeppelin. The growls, the feedback, the note bending and the volume began to take seed in my musical thoughts. My practicing was all involved into getting this sound and these effects.[105]

This included alternate fingerings, pitch bends, and singing through the instrument. His specific suggestions are presented in Chapter IV.

With the success of Robert Spring's recordings and performances of *Black Dog*, he and his colleague Joshua Gardner commissioned Scott McAllister to write a double concerto for two clarinets and orchestra. McAllister was also thinking about his favorite songs from his youth and focused in on the Lynyrd Skynyrd song "Free Bird."[106] He explains, "I remember those dueling guitar solos. They went on forever in the long version of that song. I thought, 'Man, this would be great for two clarinets.'"[107] The result was *Freebirds*, a tour de force of glissandos, extreme high register playing, and rapid technical passages (not to mention pitch bends that sound like bird calls) as the two clarinets take the roles of dueling guitars.

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[104] Robert Spring, "Master Class: Black Dog by Scott McAllister," *Clarinet* 44, no. 3 (June 2017): 22.
[105] Spring, "Master Class," 22.
[106] James Gruetzner, "Technical and Performance Analysis of Scott McAllister's Devil Sticks, Uncle Sam's Songbag Vol. I, Freebirds, and Funk," (DMA diss., University of Southern Mississippi, 2018), 75. Accessed November 4, 2018. https://aquila.usm.edu/cgi/viewcontent.cgi?article=2609&context=dissertations.
[107] Gruetzner, "Technical and Performance Analysis," 75.

McAllister points out in both *Black Dog* and *X*, "You can see a lot of Jimi Hendrix and [Jimmy Page] who do these great electric guitar solos that I had in my ear since I was kid. I thought that it would be neat to play them on the clarinet. It is not the exact notes, but it's the same gestures."[108] In his dissertation on rock music's influence in McAllister's works, Chris Money compares gestures from *X* and *Black Dog* to vocal and guitar lines in songs by Hendrix and Led Zeppelin, Alice in Chains, Nirvana, and Deep Purple. These include melodic fragments, rhythms, trills, and rapid arpeggios and repeated figures. Similar to Money, James Gruetzner does a thorough job of comparing the general gestures of the dual guitar solos—"high energy, fast, sweeping arpeggios, driving rhythms, and fast repeated notes"—in "Free Bird" with the dual clarinet solos in *Freebirds.*[109]

I noticed a few things about the "fast repeated" passages in McAllister's works. While they sound difficult, they are extremely idiomatic to the clarinet. I have a feeling many of the virtuosic-sounding passages in guitar solos are also idiomatic to the guitar. This is confirmed in the case of "Eruption" by guitarist, teacher, and YouTuber Carl Brown, who says, "The tapping part that everybody knows is actually the easiest part of the song to do. All of the stuff leading up to that is *much* more difficult to play."[110] However, I find McAllister's passages sound somehow less "guitar-like" than correlative rapid passages from "One," "Eruption," or "Stairway to Heaven." After listening closely, the difference seems to be due to note selection. The guitar gestures tend to follow either baroque-style chord progressions, or blues patterns (patterns that use the blues or minor

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[108] Tori L. Patterson, "A Performance Analysis of Stylistic Features of Scott McAllister's Selected Works for Solo Clarinet: Four Preludes on Playthings of the Wind, Black Dog: Rhapsody for Clarinet (and Piano), and Bling Bling" (DMA diss., Florida State University, 2008), 56, accessed November 4, 2018, http://purl.flvc.org/fsu/fd/FSU_migr_etd-2124. McAllister originally mentioned Robert Plant, a songwriter and the lead singer for Led Zeppelin, but was surely referring to guitarist Jimmy Page.

[109] Gruetzner, "Technical and Performance Analysis," 82.

[110] Carl Brown, "Eruption Guitar Lesson Pt. 1 - Van Halen" (tutorial video), *GuitarLessons365*, posted December 27, 2015, accessed December 14, 2018, https://youtu.be/mvtXX1CzKaM.

pentatonic scales), and McAllister's gestures do not. This gives the music a slightly different feel, though I would say this is what *distinguishes* McAllister's work from a pure transcription. His manipulation of these figures along with the aforementioned melodic fragments and rhythms is precisely what one would expect a composer to do with the raw material of grunge and hard rock music.

One other composer whose roots are in heavy metal is New York-based Haralabos (Harry) Stafylakis. Stafylakis was a guitarist and vocalist for several years in a metal band, and his compositions include "metal's power chords, dense textures, guitar-riff basslines and complex rhythms."[111] He considers contemporary metal bands "as integral to my sound world as Beethoven and Stravinsky," sharing that this is not solely because of his background, but that he believes art music should be more inclusive, rather than "as difficult and innovative as possible."[112] (I would argue that the majority of this investigation shows that these two adjectives and heavy metal are far from mutually exclusive.) He generally avoids the "cheesiness" of the major scale, preferring to use different modes that change frequently. His compositions share this feature with several hard rock and heavy metal songs, which use mode mixture, power chords (which contain only the root and fifth),[113] and scales that contain both the major and minor third.[114] He has also worked with the progressive metal band Animals as Leaders in adapting their music for metal band and orchestra.[115]

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[111] Elissa Poole, "Growing Classical Music from Metal Roots," *Words & Music* 19, no. 2 (Summer 2012): 9.
[112] Poole, "Growing Classical," 9.
[113] *Merriam-Webster Dictionary,* s.v., "power chord," accessed July 15, 2021, https://www.merriam-webster.com/dictionary/power%20chord.
[114] Poole, "Growing Classical," 9.
[115] Haralabos Stafylakis, "Biography," March 4, 2021, accessed July 19, 2021, https://www.hstafylakis.com/fullbio/.

II. A Selective History of Blues and Rock

This section will take a look at some historical context of blues and rock music, but only looking at a few facets of this Hope Diamond of a subject. Taking a look at the technique, technology, sounds, motives, and experimental attitude of blues and rock musicians in the twentieth century will help put this current study into perspective. Additionally, tracing the lineage of influences is necessary for framing the demographic changes of both rock musicians and their audiences throughout the twentieth century. In particular, one must understand the role of African American men and women in the development of the guitar solo.

Blues Guitar Becomes Electrified

Many of the scales, bends, vibrato techniques, and overall styles heard in the most well-known electric guitar solos started in the first decades of the twentieth century. Blues musicians from the Delta region of Mississippi such as Sylvester Weaver and Blind Willie Johnson played their acoustic and resonator guitars using "bent and frayed notes, microtones, and vibrato, played with a slide and by bending and stretching fretted notes."[116] In Charlie Patton's 1929 song "Down the Dirt Road Blues," one can hear Patton "drumming on damped strings, [and] adding bass accents and descending melodic runs on the treble strings to create counter-rhythms."[117] As evidence of Amiri Baraka's earlier comparison of the blues to the human voice, the use of the slide made the instrument "talk" in "strikingly speechlike inflections."[118]

In the 1930's, Texas-born artists such as Eddie Durham and Charlie Christian, both of whom played a Gibson ES-150, were some of the first artists to perform on, and record with the

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[116] McGovern, "The Music," 22.
[117] Elijah Wald, *The Blues: A Very Short Introduction* (Oxford: Oxford University Press, 2010), 36.
[118] Robert Palmer, *Deep Blues: A Musical and Cultural History of the Mississippi Delta* (Middlesex, England: Penguin Books, 1981), 44.

electric guitar. While we think of the Chicago blues as perhaps most formative style that used the electric guitar, one of the earliest defining figures was the Texas-born West Coast performer Aaron "T-Bone" Walker. Music historian Elijah Wald describes his guitar playing on "Mean Old World" (1942) as "a startling innovation … Walker mixed the harmonic sensibility and precision of Oscar and Johnny Moore with a deep blues feel, the bite of the older slide players, and the energy of the bluesier saxophonists, blazing a trail that would be followed by virtually all the electric blues and rock guitar heroes to come."[119] Walker frequently performed in Chicago clubs, and Chicago-based musicians could hear his recordings made in the 1940s.

Of critical mention is one other electric guitar player who strongly influenced the early sound of the Chicago blues: female guitarist Memphis Minnie (born Lizzy Douglas). Minnie had established herself after recording several songs in Memphis on acoustic guitar before moving to Chicago in the early 1930s. "As a Chicago blues contemporary of Big Bill Broonzy and Muddy Waters, Memphis Minnie helped to define a style of playing that exploited the unique sound of the electric guitar."[120] Reportedly, shortly after moving to Chicago, Minnie won "cutting contests" (musical battles, usually between players of the same instrument like piano, saxophone, or guitar) against both Broonzy and Waters, though this was before she began playing electric guitar at the end of the 1930s.[121] Steve Waksman paraphrases a book about Minnie's music and career by Paul and Beth Garon, saying, "Her local prestige played no small part in establishing the value of the instrument among the city's musicians."[122]

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[119] Wald, *The Blues*, 53
[120] John Strohm, "Women Guitarists: Gender Issues in Alternative Rock," in Millard, *Electric Guitar,* 184.
[121] Paul Garon and Beth Garon, *Woman with Guitar: Memphis Minnie's Blues* (New York: Da Capo Press, 1992), 72-73, accessed July 12, 2021, https://search-alexanderstreet-com.ezproxy.library.wisc.edu/ view/work/bibliographic_entity%7C bibliographic_details%7C457921
[122] Garon and Garon, *Woman with Guitar*, paraphrased in Waksman, *Instruments*, 122.

The distinguishing feature of the electric guitar was the electromagnetic pickup beneath the strings that transmitted their vibrations to an amplifier. Distortion came from the volume of the signals from the pickups overloading the vacuum tubes on the amplifier, and "turned out to have considerable musicality and harmonic potential."[123] Many Chicago musicians were using amplification simply to be heard on the street or in bars, but Muddy Waters's band in the late 1940s was the first to use that amplification to achieve a "rawer, ferocious, more physical" sound.[124] Waters and other Delta guitarists like Elmore James were also the first to experiment with feedback and distortion on recordings.[125] Guitar Slim liked the sound so much that he "opted to run his guitar through a cheap PA system instead of an amplifier specifically *because* it distorted so much."[126] Earlier guitarists Charlie Christian and T-Bone Walker used distortion only sparingly, but both understood that "a distorted sound, heavy with overtones and static, could be a viable part of the electric's overall aesthetic."[127] For Walker, it was a tool in his toolbox, "a form of accent, another coloration of notes and tones to convey [his] stories."[128]

"Noise" as Expression, Redux

Things got even more "raw" and "ferocious" in 1951 when Howlin' Wolf recorded "How Many More Years." Robert Palmer gives a visceral description of the recording, featuring guitarist Willie Johnson: "His thunderous power chords were surely the most *electric* guitar sound that had been heard on records. Wolf's rasping voice sounded strong enough to shear steel; this music was heavy metal years before the term was coined."[129] (Palmer also describes Pat Hare's power-chord-packed playing on "Cotton Crop Blues" in 1954 as such: "Rarely has a grittier, nastier, more

[123] André Millard, "Playing with Power," in Millard, *Electric Guitar*, 137.
[124] Palmer, *Deep Blues,* 16.
[125] Palmer, *Deep Blues*, 16.
[126] Susan Schmidt-Horning, "Recording: The Search for the Sound," in Millard, *Electric Guitar,* 114.
[127] McGovern, "The Music," 22.
[128] McGovern, "The Music," 32.
[129] Palmer, *Deep Blues*, 234.

ferocious electric-guitar sound been captured on record. … The first heavy-metal record? I'd say yes, with tongue only slightly in cheek.")[130] Also in 1951, Ike Turner recorded "Rocket 88" at producer Sam Phillips's Memphis Recording Service (later Sun Studio), which some argue was the first rock and roll record. While driving to Memphis, guitarist Willie Kizart's amplifier fell off of the roof of the car. Sam Phillips retells, "When it fell, that burst the speaker cone. We had no way of getting it fixed … so we started playing around with the damn thing. I stuffed a little paper in there where the speaker cone was ruptured, and it sounded good. It sounded like a saxophone. And we decided to go ahead and record."[131] This is probably the first recorded example of achieving, though by accident, a "fuzz" effect. Phillips liked the sound so much that "within a few years he devised a method of reproducing his serendipitous discovery in a way that did not necessitate the permanent destruction of a speaker cone—by placing cardboard boxes over the amps and cutting a hole in one of the boxes to achieve a crude fuzz effect from the rattling sound."[132]

Of note here is another trend in the up-tempo "jump blues" in the 1940s: The use of the saxophone. Not only *that* they were used but *how* they were used. In bands like Louis Jordan's Tympany Five, the guitar took a backseat to the saxophone, a trend that continued into the 1950s when "rock 'n' roll was more the sound of the piano and the saxophone than the guitar."[133] During the 1940s, tenor saxophone "honkers" "eschewed melodic improvisation in favor of minimalist rhythmic punch. [Big Jay McNeely] played one or two notes over and over, in a sexy growl that gradually rose to a series of wild honks and screams."[134] An identifying feature of saxophone playing during this time is this "growl," performed by singing with the vocal chords while blowing into the saxophone. One may or may not be able to make a causal relationship between this style of

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[130] Robert Palmer, *Rock & Roll: An Unruly History* (New York: Harmony Books, 1995), 204.
[131] Palmer, *Rock & Roll*, 201-202.
[132] Susan Schmidt-Horning, "Recording," 114.
[133] André Millard, "Solidbody Electric Guitars," in Millard, *Electric Guitar*, 89.
[134] Wald, *Blues*, 56.

saxophone playing and the distorted sounds that the electric guitar achieved, but these players certainly heard and influenced each other. For the purposes of this study, postulating that perhaps these experiments with sound can be traced back to a single-reed woodwind instrument after all is thought-provoking and may warrant futher study, if nothing else. The first piece of evidence for such a study may be guitarist Robert Lockwood Jr.'s assertion, "That's where all the good electric guitar players get their ideas, from other types of instruments."[135]

Moving forward into the 1960s, a world of sound and color opened up for guitarists with the advent of effects pedals, and a philosophy of experimentation. (Note: I don't think that it is a coincidence that classical musicians began experimenting with extended techniques during this decade as well.) Bo Diddley, for example, continually experimented with electronics in an effort to find a sound that he liked. "Sometimes his playing emulated the roars of the jet engines whose images adorned his instruments; at other times he created an atmospheric sound featuring layers of reverb and echo. On his tour de force 'Mumblin Guitar' [1960] Diddley took his guitar through its paces generating sounds reminiscent of a turbine, bongos, and an electric percolator."[136] Jimmy Page, guitarist for Led Zeppelin, experimented with using a violin bow on his guitar, an example of which is on "Dazed and Confused," recorded in 1967. This was not a gimmick. "Page, like Hendrix before him, is concerned with using the electric guitar to expand the sonic palette of rock, and is further interested in increasing the possible sounds derived from the guitar itself."

Of course, any discussion of the sonic range of the guitar must include, and some would argue could begin and end with, Jimi Hendrix. Near the end of his life, Electric Lady Studios was commissioned by, and built for, Hendrix as his "laboratory" to record any ideas, sounds, or experiments that came to him (sometimes literally in his dreams). "Jimi Hendrix did more to

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[135] Palmer, *Deep Blues,* 198.
[136] McGovern, "The Music," in Millard, *Electric Guitar*, 33.

reinvent the sound of the electric guitar than any musician since Les Paul."[137] Guitarist Michael Bloomfield, in discussing the first time he saw Hendrix perform, gives an apt description of his playing: "H bombs were going off, guided missiles were flying—I can't tell you the sounds he was getting out of his instrument. He was getting every sound I was ever to hear him get right there in that room with a Stratocaster, a Twin (amplifier), a Maestro fuzz tone, and that was all—he was doing it mainly through extreme volume," adding, "I didn't even want to pick up a guitar for the next year."[138] Anyone who has heard his Woodstock rendition of "The Star-Spangled Banner" understands Bloomfield's sentiment. In it, he uses (at a minimum) a Fuzzface distortion pedal, wah-wah pedal, and Univibe pedal ("a transistorized device that imitates the sound of a rotating, or Leslie, speaker"),[139] deliberate feedback, vibrato bar dives, wide bar vibrato, choking strings, raking strings, strummed slacked strings, and of course bent notes and fretting-hand vibrato.[140] But knowing that he uses these techniques does not make the solo seem any less inimitable. As many have observed, these techniques combined to create the sounds of bombs, sirens, screaming, and machine gun fire to imitate, and therefore protest, the Vietnam War.

Hendrix took the production of new sounds to the literal limit when, in 1967 at the Monterey Pop Festival, "Hendrix smashed and burned his guitar, and kept his amps on full-throttle. The sound of guitar strings vibrating and uncoiling as the instrument crumpled and went up in flames was not just showmanship, as in the Who's instrument-smashing rampages; it was *music*."[141] Now *that* is an "extended technique," though it may be harder to imitate that one on a clarinet (it might burn easier, however). *Guitar Player* magazine even published an article of "Jimi's Favorite

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[137] Schmidt-Horning, "Recording," in Millard, *Electric Guitar*, 118.
[138] Michael Bloomfield, "Michael Bloomfield Reminisces," in Obrecht, *Masters of Heavy Metal* (New York: Quill, 1984), 31.
[139] Stephen Valdez, "The Development of the Electric Guitar Solo in Rock Music, 1954-1971," (DMA diss., University of Oregon, 1992), 29.
[140] *Guitar World* editors, *100 Greatest Guitar Solos of All Time* (Milwaukee: Hal Leonard, 2013), 233-235.
[141] Palmer, *Rock & Roll*, 228.

Techniques," consisting of 10 unique ways that Hendrix played or held the guitar. Number two is "Destruction as Music."[142] The author of that article, Don Menn, astutely sums up Jimi Hendrix's innovations: "Years of experimentation with body placements, an extraordinary sense of equipment characteristics, a childlike willingness to play with the possibilities that sounded 'bad,' an extraordinary intuitiveness and capacity to work on his feet with whatever started happening in his equipment, combined to help Jimi develop his unparalleled electrical inventiveness."[143]

If some would claim Hendrix's "Star-Spangled Banner" as the most famous solo electric guitar performance in history, then second place would surely go to Eddie Van Halen's "Eruption." Like Hendrix's, the techniques in "Eruption" were new to many listeners. In addition to the extreme bar dives mentioned before, he uses distortion, natural harmonics, artificial harmonics, pinch harmonics, palm muting, bar vibrato, and feedback, plus a lengthy passage of rapid tapping.[144] All of these go by with barely a pause for the listener to think, "What did I just listen to?"

An interview in *Guitar Player* magazine goes systematically through some of the other unique sounds that Van Halen was able to achieve on his instrument. He got a scratchy sound in "Atomic Punk" by rubbing the strings near the bridge with the heel of his hand; a staccato effect that sounds like a lurching car in the solo section of "You Really Got Me" by flicking his (pickup) toggle switch back and forth; and a clicking sound in the middle of "Romeo's Delight" by shaking his low E string against the pickup. In the opening of "And the Cradle Will Rock," he gets a sound resembling "a prop plane starting up" thusly: "I pinged my strings above the nut and asked [producer] Ted [Templeman] to play it backwards so the attack comes at the end of the note. In conjunction with this, I scraped the springs in the back of my guitar. I also took my vibrato bar all the way down so that the strings were limp and then with my left thumb I flapped the low E string around the 3rd

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[142] Don Menn, "Jimi's Favorite Techniques," republished in Obrecht, *Masters*, 29.
[143] Menn, "Jimi's Favorite Techniques," in Obrecht, *Masters*, 30.
[144] *Guitar World*, *100 Greatest*, 78-81.

fret."[145] Again, these innovations and the willingness to experiment with every way to play the instrument is in the same spirit as clarinet extended technique pioneers like William O. Smith.

One example of how this "noise" has moved into the twenty-first century is the playing of St. Vincent (Annie Clark). Guitar was her "obsession" from the time she was a child and saw her first electric guitar in the movie *La Bamba*.[146] St. Vincent made an impression when she toured with Sufjan Stevens: "There was always a moment in the set where people could 'take a solo.' … All the men usually just played a lot of notes really fast. But, when Annie's turn came, she refused to do the obvious white-male masturbatory thing on the guitar. Instead, she played with her effects pedals. She made such weird sounds. It was like the Loch Ness monster giving birth in a silo."[147] An article published on *Vulture*'s website catalogues some of her sounds in a similar way to Van Halen's above: "'Birth in Reverse,' which kicks off with a noise rock chord that she strums on the opposite side of the fretboard; 'Surgeon,' where she overlays a jazz riff with another guitar section that sounds like she is bending a rubber band; and 'Your Lips Are Red,' where her guitar is distorted beyond recognition, sounding closer to a power tool than an actual instrument."[148] Once again, these visceral descriptions refer to "noise" that paints pictures and evokes emotions. However, perhaps these sounds of St. Vincent are past the capabilities of what a clarinet can imitate…for now.

Influences and Lineage

The clearest line of influence for any of the guitar players in this project goes back to guitarist Robert Johnson (though many other blues guitarists came before him). For some, it is a

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[145] Jas Obrecht, "Van Halen," in Obrecht, *Masters*, 158-159.
[146] Ernie Ball Music, "The Making of St.Vincent's Ernie Ball Music Man Signature Guitar," (video), January 20, 2016, accessed July 22, 2021, https://youtu.be/5M5qpaQ1h9o.
[147] Nick Paumgarten, "St. Vincent's Cheeky, Sexy Rock," *New Yorker*, August 21,2017, accessed July 22, 2021, https://www.newyorker.com/magazine/2017/08/28/st-vincents-cheeky-sexy-rock.
[148] Alex Suskind, "An Appreciation of St. Vincent's Guitar Skills," *Vulture*, October 16, 2017, accessed July 22, 2021, https://www.vulture.com/2017/10/why-dont-we-talk-more-about-st-vincents-guitar-skills.html.

direct line: Eric Clapton, Keith Richards, and George Harrison all cited Johnson as an influence.[149] The graphic novel *Theft! A History of Music* draws literal straight lines connecting songs by Robert Johnson to covers by modern players (see Figure 2). In all of these cases, the inspiration was made via Johnson's recordings. The only guitarist Johnson is known to have actually given lessons to is Robert Lockwood Jr., who in turn taught Muddy Waters and Riley "B.B." King.[150]

Howlin' Wolf had learned from Charlie Patton, and played alongside both Robert Johnson and Robert Lockwood, Jr. In addition to listening to recordings of Delta blues musicians, guitarist Paul Burlison performed on air with Howlin Wolf's band on several occasions. Burlison's playing with his Rock and Roll Trio had a "fuzzed-out, distorted lead guitar" sound (also supposedly due to a dropped amp). The Trio's recordings influenced the English group Johnny Kidd and the Pirates whose guitarist, Mick Green, "soon became the idol of a younger generation of English guitarists, among them Eric Clapton, Jeff Beck, Jimmy Page, and Pete Townsend."[151] Clapton, in particular, was a formative influence on Eddie Van Halen.[152]

These British musicians and the musicians in the bands with whom they played immersed themselves in recordings of American blues masters. The Yardbirds, whose members included Beck, Clapton, and Page at one time or another, "covered songs by John Lee Hooker, Howlin' Wolf, and Elmore James and did so with great respect and few changes." Unfortunately, British musicians had to reintroduce the blues to American audiences. Buddy Guy (whose main influence was B.B. King) shared in an interview, "After the Beatles and the Rolling Stones made big hits out of these things, they came to this country and told the people where they got their ideas from…They did a lot for

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[149] Keith Aoki, James Boyle, and Jennifer Jenkins, *Theft: A History of Music* (Creative Commons License, 2017), 124.
[150] Palmer, *Deep Blues*, 178-179.
[151] Palmer, *Deep Blues*, 235-236.
[152] Brian Hyatt, "Eddie Van Halen on His Guitar Heroes and How He Found His Sound," *Rolling Stone*, October 6, 2020, accessed July 20, 2021, https://www.rollingstone.com/music/music-news/who-were-eddie-van-halen-influences-1071780/

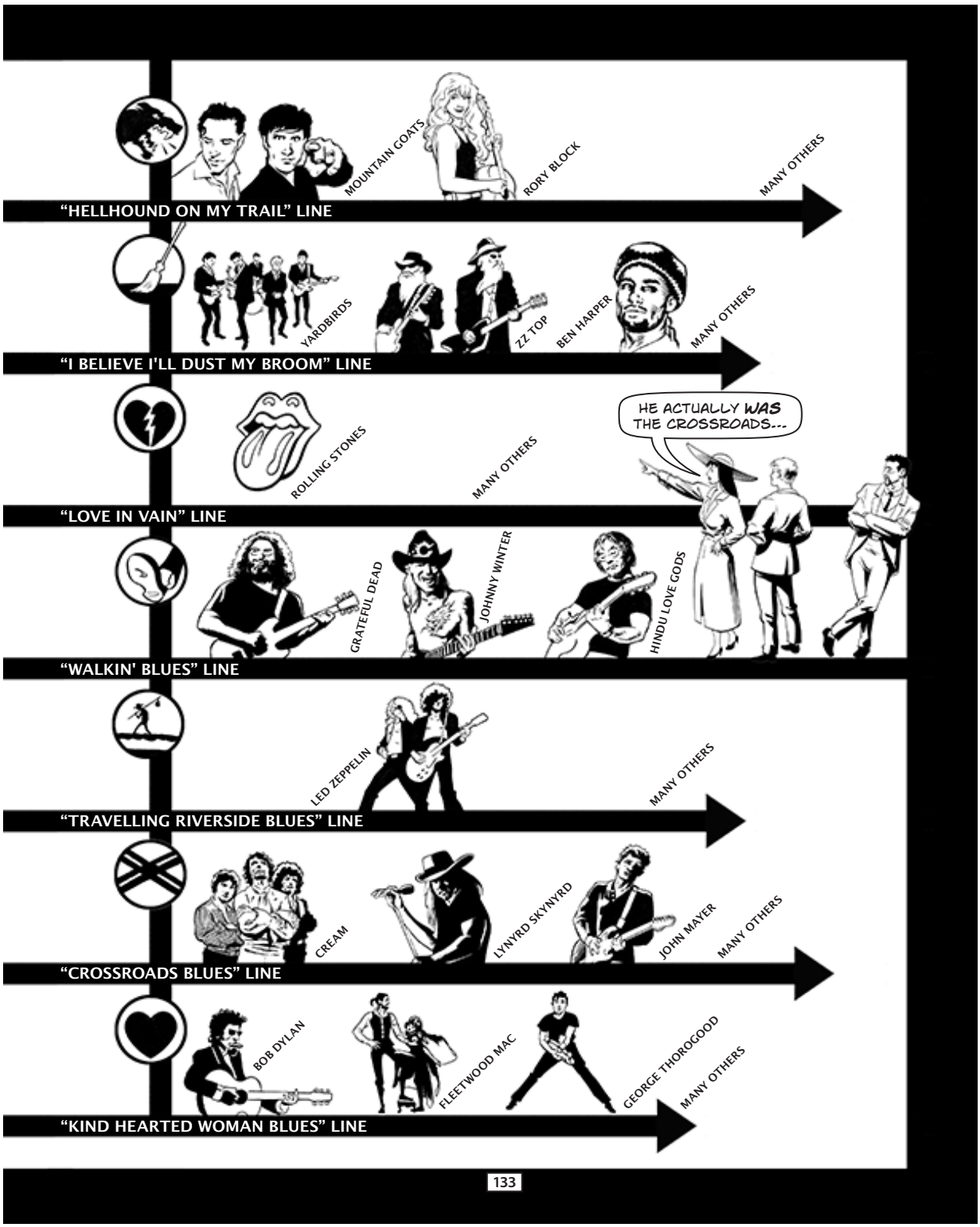

Figure 2. Covers of Songs by Robert Johnson[153]

[153] Keith Aoki, James Boyle, and Jennifer Jenkins, *Theft*, 133.

us. A lot of white people never knew about our great musicians."[154] Muddy Waters shares a similar story: "One of the first things the Beatles said when they got here was that they wanted to go see Muddy Waters and Bo Diddley. Some reporter said, 'Where's that?' They laughed and said, 'Don't you know who your own famous people are here?'"[155] I was not able to verify whether or not this exchange actually took place, but given Guy's similar description of events, it is more than plausible.

Jimi Hendrix listened to everyone. He likely heard Earl King's playing on the R&B circuit, and grew up listening to Muddy Waters, Howlin' Wolf, and B.B. King. How much of an influence was Muddy Waters? "The first guitarist I was aware of was Muddy Waters. I heard one of his old records when I was a little boy and it scared me to death, because I heard all of those sounds. Wow, what is that all about? It was great." This bears an uncanny resemblance to Michael Bloomfield's above description of Hendrix's own playing. Jimi Hendrix, in turn, surely influenced every guitar player alive today in some way.[156]

Sister Rosetta Tharpe

With the possible exception of Memphis Minnie, no woman influenced the development of guitar playing in the United States more than Sister Rosetta Tharpe. Tharpe inspired the likes of Elvis Presley, Carl Perkins, Jerry Lee Lewis, Johnny Cash, Aretha Franklin, Bob Dylan, and Isaac Hayes. Chuck Berry once described his entire career as "one long Sister Rosetta Tharpe impersonation," and Little Richard called her "his greatest influence, and Tharpe was the first to put him on stage, a tale Richard recounts in his autobiography."[157] The Staple Singers, Nina Simone, Paul Butterfield, Van Morrison, Led Zeppelin, and The Grateful Dead have all covered Tharpe's

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[154] Hank Lebo, "Buddy Guy," *Guitar Player*, Febuary, 1969, 21.
[155] James Rooney, *Bossmen: Bill Monroe & Muddy Waters* (New York: Dial Press, 1971), 144.
[156] Palmer, *Rock & Roll,* 210-211.
[157] Stu Hackel, "Sister Rosetta Tharpe: The Godmother of Rock 'N' Roll," Udiscovermusic, March 20, 2021, accessed July 13, 2021, https://www.udiscovermusic.com/stories/sister-rosetta-tharpe-rocknroll-pioneer/.

"Nobody's Fault But Mine," and "her 1950s rendition of the traditional gospel song 'This Train' directly influenced Bruce Springsteen's 1999 song 'Land of Hope and Dreams.'"[158] An article from NPR describes her success, her breadth, and her stardom:

> As a gospel star in the late 1930s and '40s, she played at New York hotspots like the Cotton Club, the Apollo Theater and Cafe Society. She toured the country, then the world: In the late '40s, on the road with The Dixie Hummingbirds, she broke records across the American South; in the '60s, she met a new generation of adoring fans across the Atlantic [including Keith Richards, Jeff Beck, and Eric Clapton]. … She didn't obey the sacred/secular divide. She fronted Count Basie's band and jammed with Duke Ellington; her 1944 song "Strange Things Happening Every Day" crossed over to Billboard's "race" (known later as "R&B") charts and, in the '50s, she even cut a single with a country star. Her (third) marriage was staged in a baseball stadium to an audience of paying fans who numbered in the tens of thousands. She was glamorous, she was charming and she played the guitar like no one else.[159]

Though Tharpe's contribution is becoming more widely recognized in the twenty-first century, including her induction into the Rock and Roll Hall of Fame in 2018, she remains considerably less well known than the other guitarists mentioned so far. This could be because she straddled the line between gospel and blues, thus defying categorization and slipping through the cracks by not falling into either the sacred or secular camps. However, her gender very likely played a large part in an era where nearly all rockers were male, and increasingly British and White. "'Rock and roll,' by definition, wasn't for women to play."[160] Her influence as a guitarist cannot be passed over or forgotten. An article in *The Guardian* describes her playing thusly: "Nobody—not Chuck Berry, not Scotty Moore, not James Burton, not Keith Richards—played wilder or more primal rock

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[158] Rock and Roll Hall of Fame, "Sister Rosetta Tharpe," July 20, 2020, accessed July 13, 2021, https://www.rockhall.com/sister-rosetta-tharpe.
[159] Melissa Lorusso, "How One of Music's Biggest Stars Almost Disappeared, and How Her Legacy Was Saved," NPR Music, September 27, 2019, accessed July 13, 2021, https://www.npr.org/2019/09/27/759601364/how-one-of-musics-biggest-stars-almost-disappeared-and-how-her-legacy-was-saved.
[160] Lorusso, "One of Music's Biggest."

'n' roll guitar than this woman who gave her life to God. … With a Gibson SG in her hands, Sister Rosetta could raise the dead. And that was before she started to sing."[161]

Tharpe demonstrates this playing in a video of a live performance of her charting R&B song "Up Above My Head" on the show *TV Gospel Time* with the Olivet Institutional Baptist Church Choir, recorded sometime between 1964 and 1965.[162] Each verse builds in intensity, volume, texture, and range. Her gospel singing is beautiful, but around 1 minute and 20 seconds in, she plays three choruses of a guitar solo that would bring the house down today. Her fretting hand slides dexterously up and down the neck of her white Gibson SG Custom, performing double-stops and blues lines along the way, all with a distortion that almost seems out of place. She bends her knees slightly and sways from side to side emphasizing what she plays, but during a long half-step bend at the end of her second chorus, when she circles her right arm a couple of times for effect, few would doubt how she earned the title, "The Godmother of Rock and Roll."

Founders of "The Church of Sonic Guitar"

The previous sections obviously examine just a sample of players in the guitar world, and just a sample of who inspired each of them, whether through listening to their recordings, touring with them, or studying with them directly. However, they tell one other story, summed up succinctly by Robert Palmer:

> Virtually every innovation associated with rock guitar playing in the 1960s can be traced back to black musicians in the middle and late 1950s—from the "heavy" sound and power chording of men like Willie Johnson and Pat Hare to proto-funk rhythms, from the "black

[161]Richard Williams, "Sister Rosetta Tharpe: the Godmother of Rock'n'Roll," *The Guardian*, March 18, 2015, accessed July 13, 2021, https://www.theguardian.com/music/2015/mar/18/sister-rosetta-tharpe-gospel-singer-100th-birthday-tribute.

[162] Sister Rosetta Tharpe, "Sister Rosetta Tharpe - Up Above My Head on Gospel Time TV show" (live performance video) posted September 29, 2006, accessed July 8, 2021; Gayle Wald, "Timeline: The Years of Sister Rosetta Tharpe," PBS American Masters, posted December 28, 2012, accessed July 26, 2021, https://www.pbs.org/wnet/americanmasters/timeline-the-years-of-sister-rosetta-tharpe/2487/.

> rockabilly" and rhythm guitar styles derived from gospel-trained players to the sainted founder of our Church of Sonic Guitar [Guitar Slim].[163]

Steve Waksman states the problem a little more directly: "When one examines the fact that, despite the overwhelming influence of African-American musical practices, the electric guitar is today cast as an overwhelmingly white instrument, it is hard to escape the conclusion that the instrument has participated in a significant act of racial expropriation."[164] Even "Mother" Maybelle Carter, whose "trademark brush strokes and rhythmic patterns … were adopted by millions of musicians," and is credited with virtually inventing the rhythm guitar, actually owes this technique—the "Carter Scratch"—to an African American guitar player. Leslie Riddle "taught Maybelle Carter how to play melody and pick rhythm on the guitar at the same time—a style for which she became famous."[165] Anyone who has studied the genre understands: Rock and roll evolved directly from the blues music that had been played by Black musicians for the previous five decades. Initially the music was "a statement of the collective experience of Africans in America," so why is the roster of "the greatest guitarists of all time" so White?

The *Guitar World* lists are good examples of this roster. Despite being published 23 years apart, both the *Guitar World* and *Total Guitar* lists are almost identical in how the demographic of artists breaks down. White guitarists outnumber Black, Hispanic, South Asian and East Asian guitarists five-to-one. *Guitar Player*'s "40 Most Influential Rock Guitar Solos" is likewise nearly identical, though it does include more Black blues players like the "Three Kings" (Freddie King, Albert King, and B.B. King—no blood relations).

Additionally, I have highlighted some of the innovative female performers on the instrument: Memphis Minnie, Sister Rosetta Tharpe, Maybelle Carter, and Annie Clark; and certainly

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[163] Robert Palmer, "The Church of the Sonic Guitar," in *Present Tense: Rock & Roll and Culture*, ed. Anthony DeCurtis (Durham, NC: Duke University Press, 1992), 37.
[164] Waksman, *Instruments*, 13.
[165] Richard Peterson, *Creating Country Music: Fabricating Authenticity* (Chicago: University of Chicago Press, 1997), 41.

there are others: Nancy Wilson, Bonnie Rait, Joan Jett, Carrie Brownstein, Nita Strauss, and many, many more. However, not a single one made it on any guitar solo list mentioned so far. "The instrument has, if anything, strengthened the male bias of public musical performance during the twentieth century."[166] Another outstanding guitarist, Jennifer Batten, who toured as Michael Jackson's lead guitarist for years, laments, "It's a shock for some people to see a woman playing the guitar. All over the world, on the Michael Jackson tour, people would ask me whether I was a man or a woman. Just because I played guitar, they assumed I was a guy. … with my blonde hair, red lipstick, and caked-on stage makeup."[167]

Being "readers polls," the 1998 and 2021 lists may say more about the reading audience for *Guitar World* magazine than they do about the artists. After the "British Invasion," moving into the 70s and 80s rock and roll included more and more bands made up of White musicians, specifically White men in their 20s and 30s. Their music was then marketed towards a similar demographic, who would inevitably be more likely to vote for players who looked like them. Record companies have segregated their listening audiences since the 1920s with the introduction of "race records." The term "rhythm & blues" was coined as a more polite way of saying "race records." Charlie Gillett spends much of his book exploring this segregation, often returning to how record companies changed or rebranded the music of Black musicians to appeal to White audiences. He makes the point:

> Had radio stations begun to operate without regard for particular markets (rhythm and blues vs popular [aka music marketed towards Black listenership vs White listenership]) from 1957 onwards —when record-buying tastes were generally similar in the two markets—it is possible that the differences in the music of black and white Americans would have been all but eliminated.[168]

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[166] Waksman, *Instruments*, 13.
[167] Waksman, *Instruents*, 6.
[168] Charlie Gillett, *The Sound of the City: The Rise of Rock and Roll*, First Da Capo Press ed.(New York: Da Capo Press, 1996), 225.

I have tried to include a diversity of players in this project, but if my selection of "well-known" solos is from the 1960s through the '90s, by definition that includes an unfortunately less-diverse pool of musicians. One area of further exploration would certainly be to investigate and promote guitar solos representing a wider range of soloists.

Note: these lists do not necessarily reflect the *current* state of music. As radio play and record sales diminish in favor of streaming playlists from Spotify, Amazon Music, and Apple Music, listeners have more choice over a wider variety of artists, rather than being told what to listen to by record companies and DJs. Because of this, the pool of talented guitarists one can readily listen to has become more diverse, including outstanding guitarists outside of the US and UK. Further, those who listen to their music on Spotify may not be the same audience that would subscribe to *Guitar World*. Still, lists like the ones put out by *Guitar World* are responsible for the lingering perception of rock guitar as a masculine, White art form.

III. Extended Techniques

As a reader may infer from the definition in the Glossary at the beginning of this work, creating a clear, workable definition for "extended techniques" is nearly impossible without defining what they are *not*. In her dissertation, Amy Humberd defines extended techniques as "any unconventional method of playing a musical instrument, usually employed to obtain particular timbres and effects. These techniques lie outside of traditional instrumental skills."[169] Composer Matthew Burtner's definition states that extended techniques "require the performer to use an instrument in a manner outside of traditionally established norms."[170] Note that these definitions require a supplementary definition for how they, or we as a culture, define "conventional," "traditional," and "norms."

Burtner does add, "These norms are apt to change as the needs of music change and as instruments develop. … The threshold between extended and traditional techniques is thus fickle."[171] Bass clarinetist Jeff Anderle expands on this:

> You can't even call it that "uncommon" in the year 2018 because it's just performance practice now. You have to learn some of those things even to have a symphony job sometimes.[172] … If you're just a working musician, you're going to come across all of these sounds. If you were to look at it in terms of popularity … going to an orchestra concert for the majority of people is really weird, it's all really weird music … compared to hearing Jimi Hendrix; that's normal. From our point of view, certain things might be really "edgy": to play with distortion or a lot of pitch-bends or something, but for most people, they're like, "Of course. Why *wouldn't* you pitch-bend?"[173]

This recalls Jeff Lynn's comments about "using strange instruments (to us)," referring to the multitude of orchestral instruments on Electric Light Orchestra's debut album. Anderle is also

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[169] Humberd, "Pedagogical Approach," 7.
[170] Burtner, "Making Noise."
[171] Burtner, "Making Noise."
[172] Igor Stravinsky, Richard Strauss, and even Pyotr Ilyich Tchaikovsky asked for flutter-tonguing in their works (Tchaikovsky only required it of flutes at the time).
[173] Anderle, interview.

arguing that extended techniques do not fall outside of "traditionally established norms." Because musicians have been using them for over 50 years, perhaps it is time to include them as part of the classical tradition. This, in part, is a gap I hope to help bridge with this project. I think that the timeline of the electric guitar laid out so far is a perfect example of the fluidity of "extended techniques." Do electric guitar players consider feedback, power chords, distortion, and harmonics extended techniques? No. They are just "techniques," many would even argue "essential techniques" (one instructional guitar book even has this phrase in the subtitle).[174]

If it is not obvious already, bass clarinetists seem a little more open to this idea than other classical instrumentalists. The vast majority of compositions for bass clarinet have been written in the twentieth and twenty-first centuries, and on top of that, nearly every bass clarinetist also cites jazz woodwind specialist Eric Allan Dolphy as an influence.[175] "Dolphy found a universe of sounds in the instrument that no one approaching it from the classical direction had yet uncovered—rhapsodic lyricism, searing wails, and animal-like squawks and grunts across an enormous registral span."[176] In his original liner notes for Dolphy's album *Last Date*, Nat Hentoff writes, referring to the fleeting nature of music, "For Eric, this was especially true. He never wanted to play anything exactly as he played it before, because he couldn't. His mind was always hearing new ways to play, to sound, to explore."[177] To me, this sounds exactly like a description of another Black musician who came to prominence in the 1960s. Coincidentally or not, both Eric Dolphy and Jimi Hendrix recorded with the same record producer, Alan Douglas. If both of them had lived long enough to collaborate, one can only imagine the result.

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[174] Michael Mueller, *Guitar Techniques: 50 Essential Techniques for All Styles* (Milwaukee, WI: Hal Leonard, 2001), cover.
[175] Russell, "Bass Clarinetist," 68.
[176] Russell, "Bass Clarinetist," 68.
[177] Nat Hentoff, liner notes to *Last Date*, recorded June 2, 1964, Limelight Records LS-86013, 1965, LP.

The more one looks at the history of the sounds created on the electric guitar, the more they see an almost uncanny resemblance to those created on the clarinet. Compare Robert Palmer's description of distortion:

> The electric guitar, once the volume has surpassed the sustain threshold, doesn't just 'ring.' It also produces overtones, sum and difference tones, interference patterns, and other acoustical phenomena. … In rock of this sort, acoustical effects can become so pronounced that they seem to 'eat,' or cancel out, the original tones whose interactions produced them;[178]

with a passage on multiphonics from Italian avant-garde clarinetist and pioneer in the field of extended clarinet techniques, Giuseppe Garbarino:

> It is also important to observe that chords [multiphonics] can comprise sounds of different kinds: apparent fundamentals, artificial harmonics, differential tones, etc.[179]

Phillip Rehfeldt adds to the conversation: "Multiphonics cannot be equated with chords," describing the multiphonic as "a complex 'sonority' rather than … a harmonic structure of quasi-equal pitches." All of this is to say, perhaps the electric guitar is actually the ideal instrument to emulate with multiphonics, which are one of the most popular extended techniques for the clarinet and bass clarinet.

Several musicians have written about how extended techniques can either emulate electronic sounds, or be an intermediary between electronic and acoustic sounds. Synthesized sounds became more popular in the 1970s and '80s, in both contemporary classical and rock/pop music. "One of the attractions for composers using clarinet multiphonics in their works is that these rich sonorities provide timbral variety comparable to electronically generated sounds, but with an additional quality which is only possible with a human performer."[180] Extended technique pioneer Eric Mandat's piece for solo clarinet, *The Jungle*, is a great example of this. Originally on a program titled, "My Life in the Jungle of Zeros and Ones," *The Jungle* was Mandat's response to the electronic sounds that he was

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[178] Palmer, *Rock & Roll*, 194.
[179] Garbarino, *Metodo*, 8.
[180] Keith Peacock, "Multiphonic Spectra," *Clarinet* 13, no. 2 (Winter 1986): 14.

hearing in new compositions at the time. It represents a struggle between digital and analogue forces, using extended techniques on an acoustic clarinet. Composers in the latter decades of the twentieth century also may have lacked the equipment or software, did not wish to learn new equipment or software, did not care for the aesthetic of synthesized sounds, or "merely wished to respond to the new sonic world as built by electronic sounds."[181] Lastly, their "unconventional" quality works alongside synthesized sounds, as a way of "blending acoustic and electro-acoustic media. The two are idiomatically integrated through the implementation of extended techniques. They are employed precisely because they *are* instrumental."[182]

Sources for Clarinet and Bass Clarinet (and Saxophone) Techniques

To be clear, this is not a pedagogical text for those new to these techniques. Detailed performance guides accompany the transcriptions, but I recommend looking at several sources in order to learn the techniques in these guides. These fall into four broad categories, though they frequently overlap (all are listed in the bibliography):

1. Encyclopedic reference books on how to notate, read, and execute extended techniques;
2. Works focusing on only one technique (i.e. microtones or multiphonics);
3. How to learn extended techniques or include them in a curriculum;
4. Compendia of all of these sources.

The sources in the last category will assist a performer in finding what they specifically need. In addition to the pedagogical goals mentioned in my introduction, Caitlin Beare's dissertation is the most comprehensive compendium of books, articles, and dissertations on extended techniques for soprano clarinet I have seen. The dissertation itself talks about each source, but Appendix A contains tables for each work, categorized by type (dissertations, books, articles, method books, and

[181] Michael Richards, "Chapter III - Multiple Sounds," The Clarinet of the Twenty-First Century, last modified July 6, 2008, accessed July 22, 2021, https://userpages.umbc.edu/~emrich/chapter3.html.
[182] Burtner, "Making Noise."

online sources), listing their content, availability, audience, strengths, and limitations. Philip Everall's dissertation is a bass clarinet compendium, spending around 20 pages reviewing extended technique literature for the bass clarinet.

Sources in category 1 have more general information but address multiple different techniques. Phillip Rehfeldt's book *New Directions for Clarinet* is perhaps the most well-known. It has an "eighth-tone" fingering chart and useful multiphonic charts for soprano and bass clarinets (though Jack Liang's dissertation mentioned below is more exhaustive), along with a catalogue of additional effects, including glissandos, slap-tonguing, circular breathing, and several others. It also includes an extensive multiphonic chart created by William O. Smith, the first person to thoroughly research the acoustical phenomenon. The bass clarinet has two similar books dedicated to it: Henri Bok's *New Techniques for the Bass Clarinet* and Harry Sparnaay's *The Bass Clarinet: A Personal History*. Both cover the extreme high register, slap-tonguing, trills and tremolos, flutter tonguing, vibrato, air sounds, teeth on the reed, glissandos, using the voice, quarter tones, multiphonics, key noise, and several others. (Note: Sparnaay's book has some critiques of the multiphonic chart in Bok's book, and is fairly unapologetic about it.)[183] Lastly, Heather Roche's website, heatherroche.net, has several lengthy and educational blog posts discussing several extended techniques in depth, on both soprano and bass clarinet. Her website is easy to search and navigate to find posts if a player has a specific technique of interest.

In category 2, Jack Liang's dissertation is an excellent source for multiphonics on the soprano clarinet. He pulls fingerings from Smith, Rehfeldt, and Gerald Farmer, and his is the only catalogue I could find that also includes multiphonics from the works of Eric Mandat. He includes two catalogues organized either by pitch or by fingering for easy researching (though he does not give information on the dynamic possibilities or sound qualities of each multiphonic, which Rehfeldt

[183] Harry Sparnaay, *The Bass Clarinet: A Personal History*, 2nd ed. (Barcelona: Periferia, 2012), 133-134.

and others do). For multiphonics on the bass clarinet, there is no better resource as of this writing than Sarah Watts's Book *Spectral Immersions*. Based on her dissertation, the book includes a lengthy catalogue of fingerings with partials notated in order of audibility. She also did spectrogram frequency analyses of what she calls "Type One" multiphonics, which are multiphonics "based on standard low note fingerings and are produced by a player manipulating the embouchure in such a way that the frequencies of the harmonic series … [produce] a strong set of multiple sounds."[184] Bok also refers to these as "1st type" multiphonics, while Roche calls them "spectral multiphonics," likely in reference to Watts's book, though Watts herself never uses the term. I like, and will use, Roche's term. Other multiphonic charts contain these, but do not categorize them specifically. Gerald Farmer's *Multiphonics and Other Contemporary Clarinet Techniques* touches on other techniques like timbre trills and glissandos, but the bulk of the work is the 72 pages with 100's of examples of multiphonic trills and tremolos (also previously the subject of his dissertation). Lastly, *Clarinet Fingerings* by Thomas Ridenour is an invaluable source for fingerings, especially in the altissimo and extreme altissimo registers, with several notes having 15 fingerings or more. The book goes all the way up to written E7.

Giuseppe Garbarino's book touches on a few different techniques, but its main benefit is the most extensive quarter- and micro-tone chart I was able to find. Additionally, it could be a category 3 book because it contains multiple exercises for internalizing quarter tones (including major scales, thirds, and arpeggios using quarter tones!) and some exercises for separating the notes of multiphonics. Note, however, that his book was written for a "full-Boehm" clarinet, so many of the fingerings will either not work, or achieve a different sound than Garbarino notates. Clarinetist Jason Alder has two quarter-tone fingering charts on his website, one for clarinet and one for bass clarinet. While not as extensive as Rehfeldt's or Garbarino's charts, I think Alder intentionally only

[184] Sarah Watts, *Spectral Immersions: A Comprehensive Guide to the Theory and Practice of Bass Clarinet Multiphonics* (Ruisbroek-Puurs: Metropolis, 2015), 1.

includes a few "practical" fingerings that are easy and logical to use. They also go extremely high (to written C8), which is useful for solos that span the full range of the guitar. Gregory Oakes' website at gregoryoakes.com focuses on two techniques: it contains fingering charts for multiphonics and microtones that the user can filter by note, tone quality, and dynamic possibility (some multiphonics can only be played forte, some only pianissimo, etc.).

In addition to the pedagogy-focused dissertations already mentioned (Beare, Humberd, Meadows, and Warren), a book by Ronald Caravan contains effective exercises and etudes for learning timbre or "color" fingering variations, quarter-tones, multiphonics, and singing while playing. Caravan's book is a good starting place for someone completely unfamiliar with these techniques. Joshua Gardner (one of the clarinetists who commissioned *Freebirds*) and Eric Hansen co-authored a book titled *Extreme Clarinet* for soprano clarinet, that goes into some detail on the extreme altissimo register, circular breathing, voicing exercises (which help with multiphonics), and double-tonguing. One of the highlights of the book is a fingering chart that goes up to written F♯7.

One other source has been especially useful for the present study. Saxophonist Derek Brown invented a style of playing that he calls "BEATBoX SAX." Through extensive experimentation, Brown has come up with methods for achieving bass drum, snare, and hihat sounds, in addition to sounds imitating a record scratch, "slap dyads," "tongue-ramming," and "true triple-tonguing." Brown also uses a way of singing and playing to produce what he calls "Tartini tones," which are actually "heterodyne frequencies" that sound lower than the lowest note on the instrument (more on those later). Brown has several tutorials for these techniques on YouTube, but he also has several on his website that require a membership to access. One of the benefits of these techniques for interpreting guitar solos is the inclusion of several unpitched sounds. The electric guitar also has unpitched sounds such as the "pick scrape" (see appendix B). Just *how* these sounds match up is the purpose of the following chapter.

IV. Guitar Effects and their Clarinet Counterparts[185]

"The clarinet is the best instrument in the whole world. It can do anything that an electric guitar can do or the cello can do. We can do that and more."[186] – Scott McAllister

When I asked Cornelius Boots if a solo like Eddie Van Halen's "Eruption" could be done on one clarinet, his response was, "Yeah, you could do it. … I'm confident it could be done."[187] McAllister's quote may have been slightly biased, but this chapter puts his claim to the test. Chapter VII will put it to the test in real time. Keep in mind, none of these techniques are truly possible to describe in words, so each player will need to experiment to get the sound they want.

Rather than research only the techniques required for the few solos included in this study, a more comprehensive approach is to match up as many sounds and techniques between the two instruments as possible. This, then, can act as a repository (or at least a starting place) for clarinetists wishing to attempt solos outside of those in Appendix A. Three sources assisted this process: the "Guitar Notation Legend" in the back of Hal Leonard's *100 Greatest Guitar Solos of All Time* (reproduced in Appendix B), another Hal Leonard book by Michael Mueller with instructions for 50 "essential techniques" for guitar, and Stephen Valdez's dissertation, "The Development of the Electric Guitar Solo in Rock Music, 1954-1971." In the latter, the section on "Ornamental Symbols and Stylistic Conventions" is devoted to the notation of guitar techniques, and what they would sound like in more traditional notation. The section "Sound Distortion Effects" contains descriptions of a few different pedals that may be unfamiliar to those who do not play the electric guitar: the Wah-Wah, Fuzz Box, Octave Divider, Chorus Effect, Phase Shifter, Univibe, and Echo/Delay.

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[185] Examples of these effects are available at clarinethero.com.
[186] Patterson, "Performance Analysis," 94.
[187] Boots, interview.

I have grouped guitar techniques into five general categories: distortion, bending, pitched effects, picking, and pitchless effects. As may be expected at this point, techniques often overlap categories.

Distortion

To quickly review, **distortion** is a buzzing or raspy quality created by pushing a signal past the maximum input that the amp or speaker can handle. Initially a side effect of electrification, the raspy quality was later intensified by the "fuzz" or "fuzzbox" pedal. One can create a buzzing sound on the clarinet in many ways, and context and experimentation will dictate which one works the best. Putting pressure on the reed (biting), or playing while the tongue stays in contact with the reed below the tip, will both create a buzzing sound. However, these both have a "muting" effect, which limits how loud the clarinet can play. If the goal is to imitate something turned up to "10," this is not ideal. Another way of achieving some distortion while still being able to play full volume, is to bring the back and middle of the tongue up toward the roof of the mouth into an "eee" position. If the back of the tongue is too low, it may produce a spectral multiphonic.

Another connection between the clarinet and distorted electric guitar is the acoustical similarity. When distortion occurs, the wave is "clipped" once it surpasses the signal limit. The louder the input, the more it is clipped:

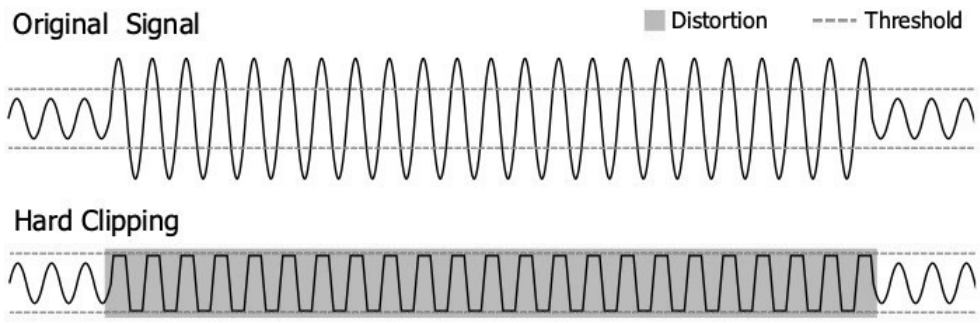

Figure 3. Clipped Sine Wave[188]

[188] https://upload.wikimedia.org/wikipedia/commons/c/ca/Clipping_waveform.svg.

As in Figure 3, the more it is clipped, the more it resembles a "square wave." As many acousticians have noted, "Clarinets are unique among orchestral instruments in having a vibration recipe that contains only the odd-numbered harmonics strongly represented, along with the fundamental."[189] Observe what happens to this sine wave as more odd-numbered partials are added:[190]

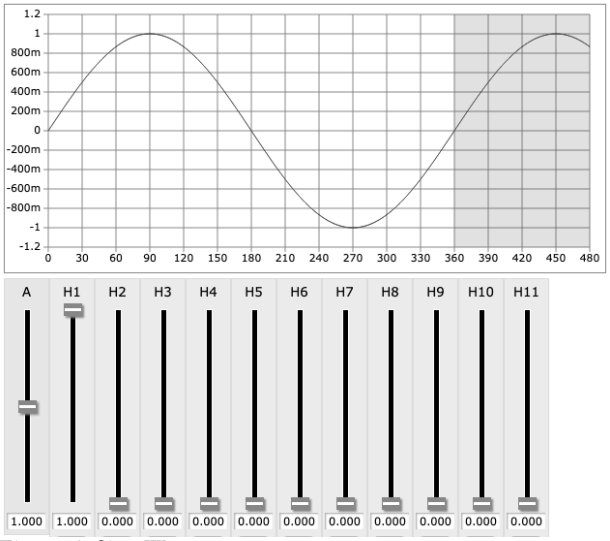

Figure 4. Sine Wave

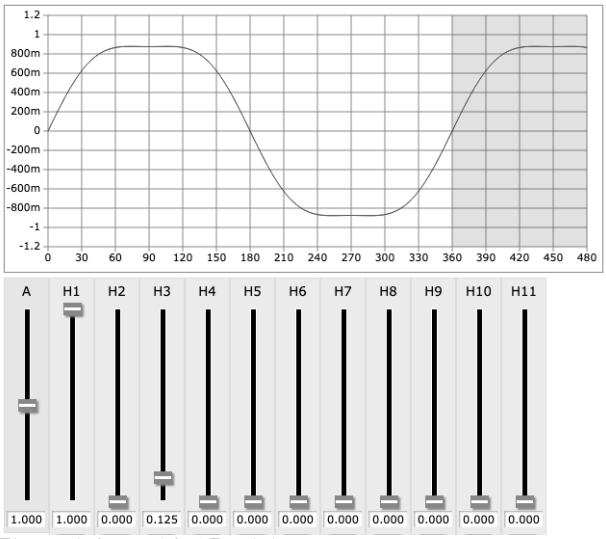

Figure 5. 1st and 3rd Partials

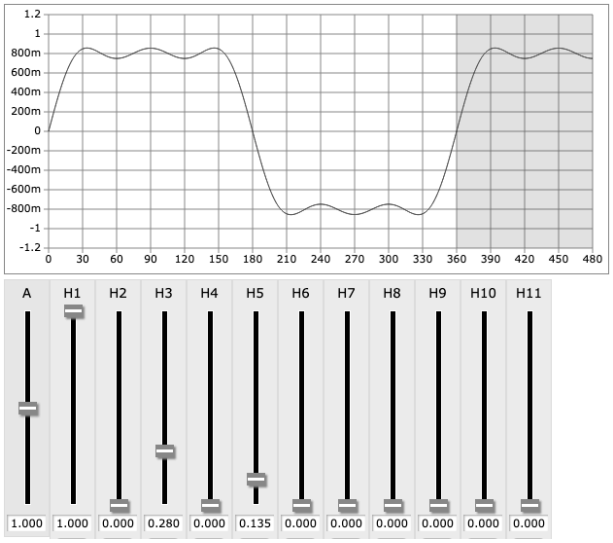

Figure 6. 1st, 3rd, and 5th Partials

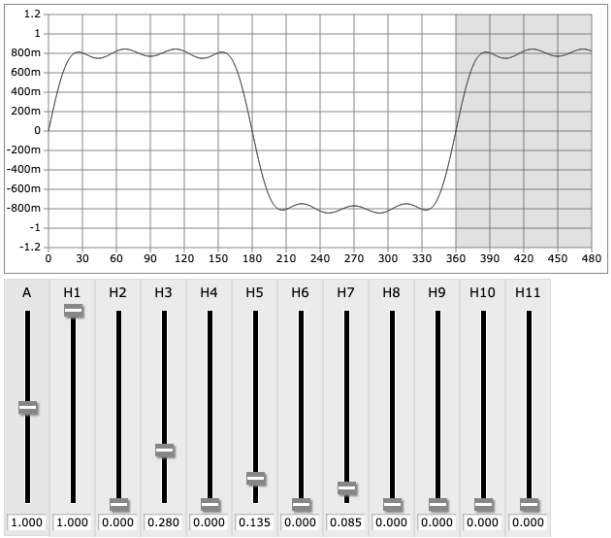

Figure 7. 1st, 3rd, 5th, and 7th Partials

[189] Arthur Benade, *Horns, Strings & Harmony* (Garden City, NY: Anchor Books, 1960), 105; Further information can be found at https://newt.phys.unsw.edu.au/jw/clarinetacoustics.html #harmonics.
[190] Waveforms created using the "additive synthesis waveform generator" at https://meettechniek.info/additional/additive-synthesis.html.

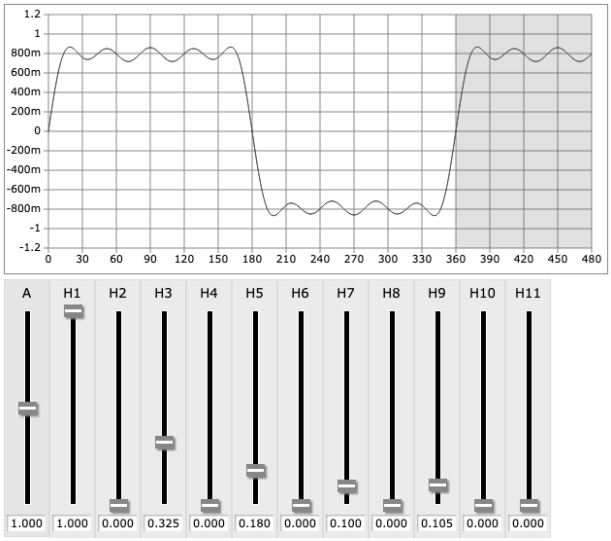

Figure 8. 1st, 3rd, 5th, 7th, and 9th Partials

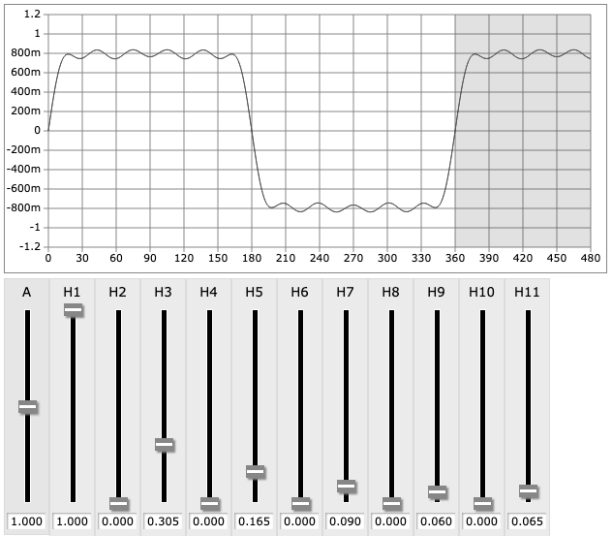

Figure 9. 1st, 3rd, 5th, 7th, 9th, and 11th partials

With each addition, the waveform gets closer and closer to a relatively square shape. This could indicate that a clarinet or bass clarinet, played loudly in the chalumeau register, might have characteristics of a distorted sound already.

Some caveats, however. One, is that distortion and fuzzbox pedals do not solely clip peaks. Below are waveforms of actual pedals' effects on a sine wave.

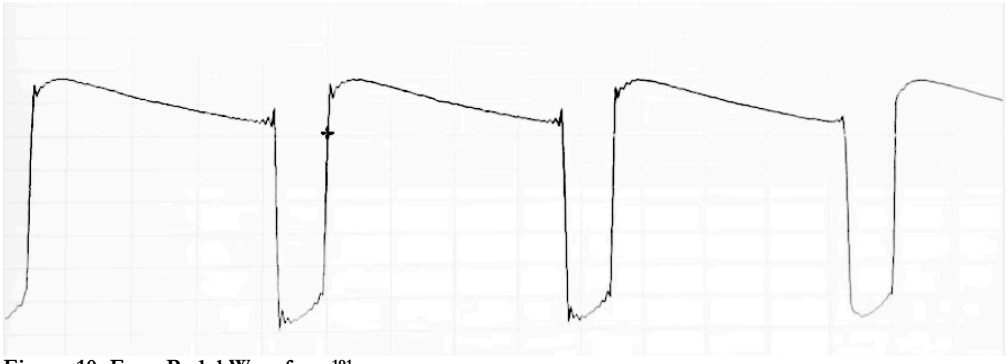

Figure 10. Fuzz Pedal Waveform[191]

This is known as "asymmetrical clipping," and this waveform has several even-numbered partials.

[191] Screenshot from Paul Graham, "Fuzz vs Overdrive vs Distortion Explained" (video), posted November 5, 2014, accessed July 25, 2021, https://youtu.be/gj8cT7WEGmo. Color adjusted for visibility.

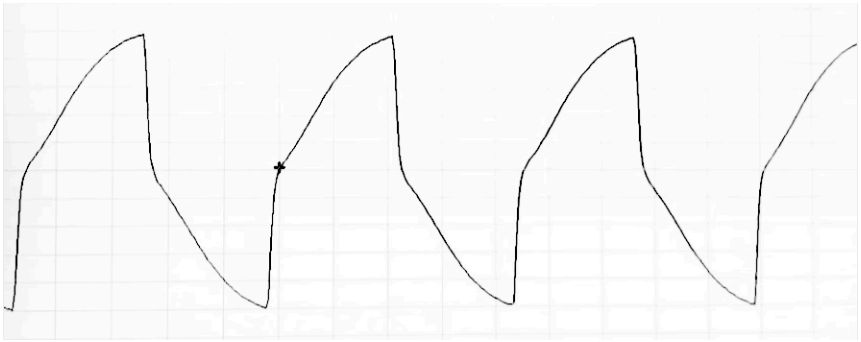

Figure 11. Distortion Pedal Waveform[192]

Though this "shark's fin" distortion wave looks dissimilar to the square wave, the spectrum diagram for this distorted wave has mostly odd partials:

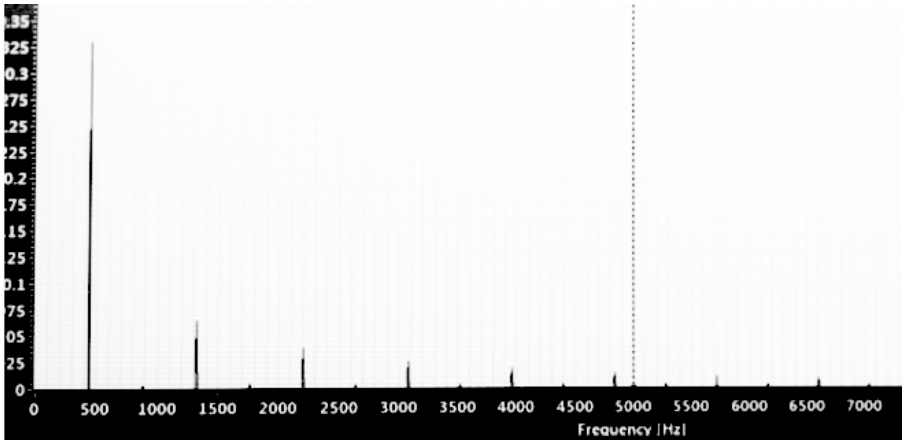

Figure 12. Distortion Pedal Spectrum Diagram[193]

The second caveat is, of course, the tone going into a pedal is much more complex than a sine wave. Similarly, a clarinet in its lowest register can sound beautiful, and myriad factors contribute to the timbre of an instrument besides the harmonic spectrum (attack, instrument material, and shape and formants of the vocal tract to name a few). A waveform from a real clarinet playing a written low F♯ actually looks like Figure 13:

[192] Screenshot from Graham, "Distortion Explained." Color adjusted for visibility.
[193] Screenshot from Graham, "Distortion Explained." Color adjusted for visibility.

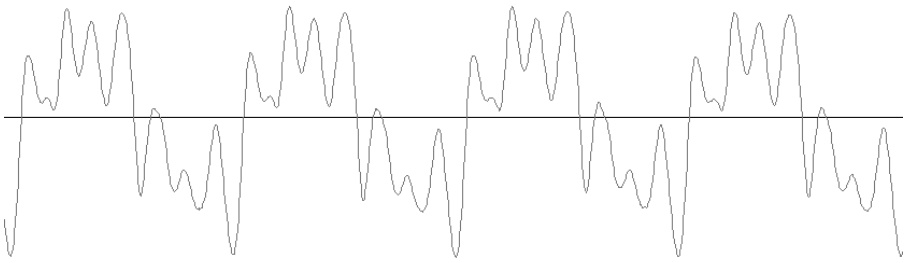

Figure 13. Clarinet Low F♯ Mezzo-Forte Waveform[194]

This is the same note played at a fortissimo dynamic:

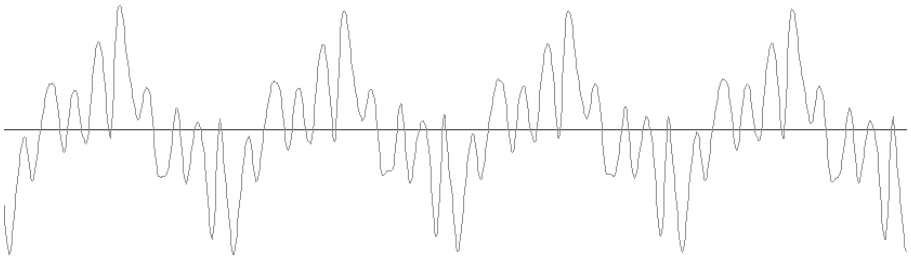

Figure 14. Clarinet Low F♯ Fortissimo Waveform

I could argue that Figure 13 resembles a square wave, and Figure 14 resembles the "shark fin" wave, but I would have to admit to a certain amount of confirmation bias. I should also note that this "odd partial" quality only exists in the low chalumeau register, and even then, the harmonics become less predictable the further the pitch gets from the lowest notes (the more holes are opened).[195]

"Power chords" fit into the "distortion" category for the same reasons Phillip Rehfeldt explained that multiphonics are not chords. They are more of a "complex sonority" than a chord, despite being made up of only a note and a perfect fifth above. This simplicity gives them their power. As Eddie Van Halen explains, "In rock and roll you only have so many chords. If you start hitting chords like this [*plays 7ths and 9ths*] in rock and roll, forget it! They have emotion, but they don't fit power rock. They're so dissonant that the vibrations of the overtones with that much

[194] Created using the open-source software program Audacity.
[195] Paul Dickens, Ryan France, John Smith, and Joe Wolfe, "Clarinet Acoustics: Introducing a Compendium of Impedance and Sound Spectra," *Acoustics Australia* 35, no. 1 (April 2007): 22-23, accessed July 3, 2021, https://newt.phys.unsw.edu.au/jw/reprints/AAclarinet.pdf.

distortion sound like shit."[196] How can clarinets imitate this sonority? First, through spectral multiphonics. Because these multiphonics utilize a "normal" fingering, the harmonics above it are, depending on what notes the player adjusts their voicing to, close to perfect intervals or thirds above the fundamental. Second, Rehfeldt, Farmer, Oakes, and Roche all have categories of multiphonics described as being loud, and having "beats," or a "pulsing character," or in Heather Roche's words, "buzzing, noisy and distorted."[197] One can try matching the pitches notated by these authors with the frequencies played by the guitar, but nothing can replace experimentation. The two websites (Oakes and Roche) have sound clips that are revelatory.

In Rehfeldt's description of these multiphonics, he adds, "Nearly identical results can be obtained, incidentally, by humming approximately a major or minor second above or below a given pitch."[198] Robert Spring, commenting on his preparation of *Black Dog,* says, "fuzz box effects were done by growling through the instrument."[199] Someone skilled in this practice can even sing a perfect fifth above or below the note that they are playing, though this may cause "heterodyne tones" (see "Practical Considerations" below).

Slides, Bends, and Vibrato

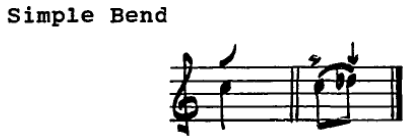

Figure 15. Bend from Valdez[200]

[196] Obrecht, "Van Halen," *Masters*, 155.
[197] Heather Roche, "Buzzing, Noisy and Distorted Multiphonics for Bb Clarinet," posted June 1, 2018, accessed July 21, 2021, https://heatherroche.net/2018/06/01/buzzing-noisy-and-distorted-multiphonics-for-bb-clarinet/.
[198] Rehfeldt, *New Directions*, 45.
[199] Spring, "Master Class," 22.
[200] Valdez, "Electric Guitar Solo," 12.

Michael Mueller's book, *Guitar Techniques: 50 Essential Techniques for All Styles* begins with two of the most ubiquitous guitar techniques: vibrato and bending. **Bends** cover a small interval, such as a step or half step. They are played on the guitar by either bending the string laterally along a fret, which raises the pitch, or by using the vibrato bar, if the guitar is equipped with one.

The clarinet can execute bends in one of three main ways. The first is the "finger glissando," where a finger is evenly slid sideways off of a hole, first uncovering a small portion, then 50%, then 75%, etc. The second is by loosening the embouchure and lowering the jaw. This often only alters the pitch a half step or less. The third way is with the tongue position. This is the most challenging to describe, but generally if the tongue moves up and forward in the mouth, the pitch scoops down dramatically (up to an octave, depending on the register and equipment). A combination of all three methods would be especially effective. Phillip Rehfeldt has charts in his book that show approximate limits of bending with a combination of the lips and tongue position for each register or note on the clarinet (Figure 16) and bass clarinet (Figure 17):

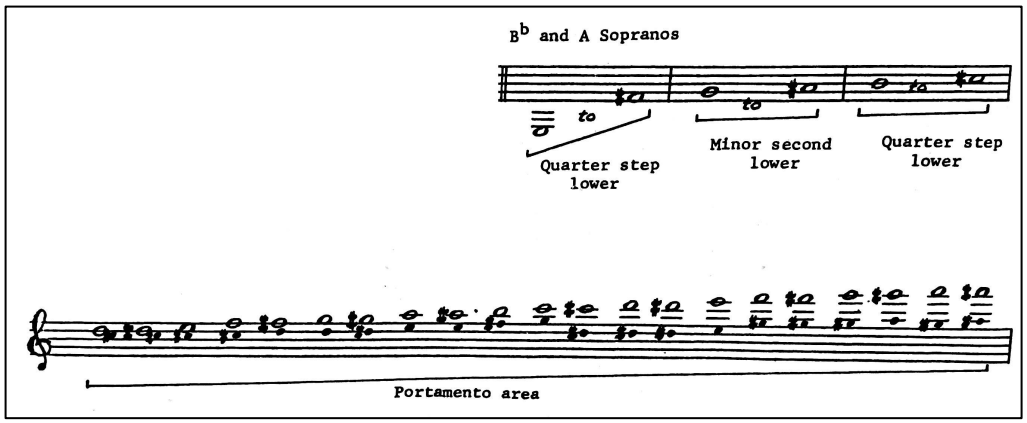

Figure 16. Rehfeldt's "Lip-bend chart," B-flat and A[201]

[201] Rehfeldt, *New Directions*, 60.

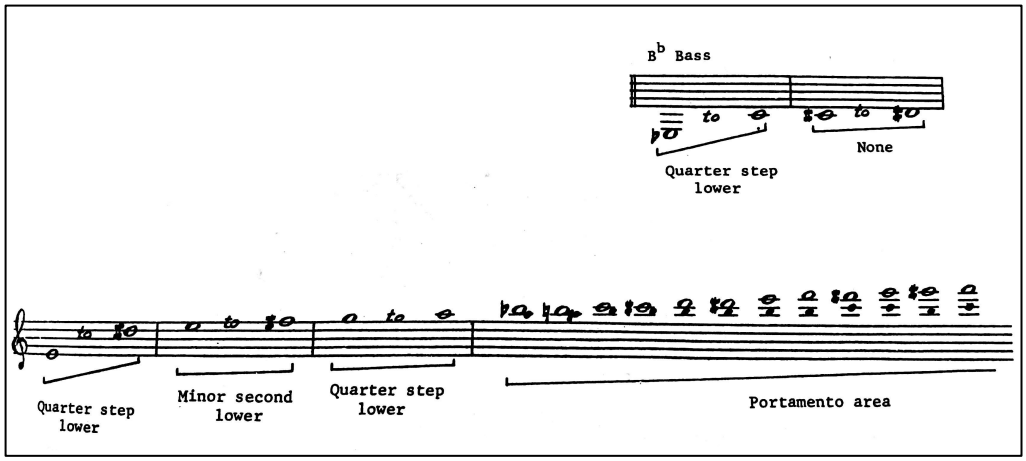

Figure 17. Rehfeldt's "Lip-bend chart," Bass[202]

The lowest tone holes of the clarinet and all of the tone holes of the bass clarinet are covered with pads that are either on or off of the hole. As Ian Anderson noted, this prevents the "finger glissando" described above. However, with extreme sensitivity and a lot of practice, the keys can be slowly raised or closed to create a glissando-like gesture. Significantly relaxing the jaw pressure on the reed helps with executing this "key glissando."

A related technique on guitar is the **"unison bend,"** during which one string is bent up until it is playing the same note as another string. Because playing a *perfect* unison this quickly is challenging, unison bends tend to have a fluttering, pulsing quality to them. The easiest way to achieve this would be through singing while playing. Either the voice or the clarinet would hold their pitch, and the other would scoop up to that same pitch from a step below. One other possible option, especially when the note in question is out of the player's vocal range, is to use one of Heather Roche's "fuzzy octave" fingerings.[203] These are near-octave multiphonics that have the slight pulsing quality of the unison bend. Obviously they are octaves, not unisons, but they sound more distorted to me, like the upper note is a harmonic on top of a unison bend.

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[202] Rehfeldt, *New Directions*, 61.

[203] Roche, Heather, "15 "fuzzy octave" multiphonics for Bb clarinet," posted November 6, 2018, accessed July 29, 2021, https://heatherroche.net/2018/11/06/15-fuzzy-octave-multiphonics-for-bb-clarinet/.

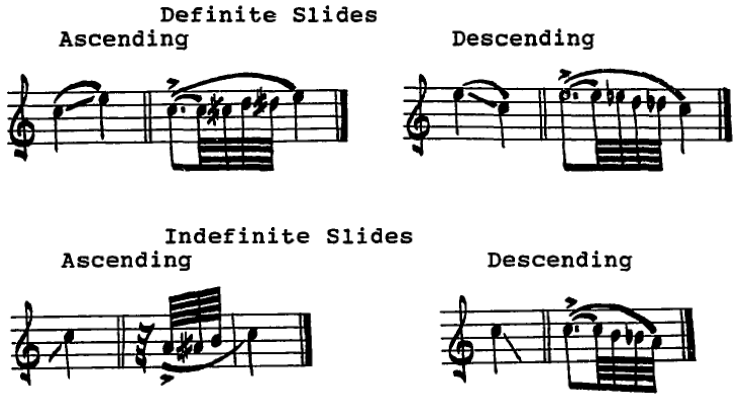

Figure 18. Slides from Valdez[204]

Slides on the guitar are done by sliding the hand down the fingerboard after a note is picked. Depending on how many distinct notes are audible, clarinetists can either do a bend, glissando, or fast chromatic scale (Figure 18). **"Power slides"** are essentially power chords that slide down the neck of the guitar. Again with practice, singing and playing simultaneously can achieve this effect, with both the voice and the fingers sliding downward at approximately the same time.

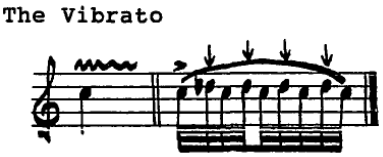

Figure 19. Vibrato from Valdez[205]

Vibrato on the guitar is similar in technique to bends, either using the vibrato bar or by rocking the hand back and forth, essentially repeatedly bending the string. On the clarinet, you would likely use the jaw in a quasi-chewing motion for subtle vibrato, and altering the tongue position for wider and wilder vibrato. We can also use a "double-lip shake" vibrato for wide vibrato. The clarinet is usually played with a "single lip" embouchure: the lower lip sits over the lower teeth, but the upper teeth are anchored on top of the mouthpiece. By putting both lips over both sets of teeth (also known as a "double lip" embouchure), the mouthpiece is held much more loosely, and

[204] Valdez, "Electric Guitar Solo," 14.
[205] Valdez, "Electric Guitar Solo," 13.

can be rapidly moved in and out of the mouth, causing a unique but effective vibrato, similar to wide bar vibrato.

If a player wants truly accurate vibrato, then the technique becomes more complicated. I discovered as I practiced these transcriptions that my clarinet still sounded like a jazzy clarinet. I realized what I believe is the problem: The clarinet usually plays at the sharpest end of any note. In other words, notes can be bent flat, but not sharp. The guitar on the other hand, almost always bends notes sharp, not flat. Unless the vibrato bar is used, the strings can only be pulled tighter. The solution I found is to play the note ¼-step sharp, but relax the jaw until I reach the note I want to vibrate from. In some cases, I found that I can use my tongue position to bend the note down a half step from the note above, then while keeping the tongue in the "bent-note" position, using the jaw brings the pitch back up. Luckily, for vibrato-bar vibrato, the pitch is lowered, so the "chewing" or "shake" vibrato can more easily imitate it.

Harmonics, Feedback, Double Stops, and Timbre Variation

Harmonics are higher notes created by either lightly touching along different spots on the string, or using "pinch harmonics," in which the picking hand plucks the string, and immediately after the thumb of the same hand lightly touches the string. Harmonics often have a pure tone, so the clarinet can simply play these notes normally. They can also be played as clarinet harmonics, where a low note is fingered, and through tongue and throat manipulation, a higher note sounds. For example, while fingering a written low E (E3), a player can "squeak" out a high E (E5) or G (G5). Natural harmonics above the seventh or nineteenth fret sound an octave and a fifth above the fundamental. This is the same interval as overblowing from the chalumeau to the clarion register of the clarinet. Clarinet harmonics often have a hint of the fundamental, so it can come out as a multiphonic, sounding even more like a guitar. Most multiphonics include a fundamental pitch

within the chalumeau range; very few overblow from the second register.[206] However, I have discovered that sometimes simply closing the jaw (biting) will produce some high tones in addition to the second or third register note. I call these "harmonic multiphonics."

The sound of a harmonic is similar to **feedback**, in which one of the overtones of a picked note or a nearby sympathetic string resonates as the guitar is brought close to a speaker. Feedback notes sound more distorted than harmonics, and some of Roche's "buzzy, distorted" multiphonics actually sound uncannily like guitar feedback. Robert Spring also imitates feedback by growling through the instrument, but this seems too similar to other techniques, and may be less precisely reproducible.

When two notes are played on a string instrument, including the guitar, it is called a **double stop.** Often, these are thirds, and have a more harmonic purpose than power chords. Yet thirds can still have a bit of a "crunchy" quality, noticeable in Sister Rosetta Tharpe's or Stevie Ray Vaughan's playing. Besides playing the solo as a duet (which is necessary for some of the solos on *Guitar World*'s list), singing this harmony through the instrument while playing will give it that quality.

Guitarists achieve the final "pitched" effect in a number of ways. That effect is when one pitch has different "timbres" to it. One common place this happens is when the same note is played on two different strings. A technique common in blues playing is when one string is bent up to the pitch of the adjacent string, which is then picked. They sound different because not only are the strings different gauges, but one might be an open string. For most notes on the clarinet, more than one fingering can achieve the same pitch, but with a different timbre or color. Contemporary composers sometimes call for "timbre trills," where these fingerings are rapidly alternated (often by the addition of just one or two keys).

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[206] Heather Roche, "9 Multiphonics That Overblow from the Second Harmonic," posted December 16, 2019, accessed July 27, 2021, https://heatherroche.net/2019/12/16/9-multiphonics-that-overblow-from-the-second-harmonic/.

A less frequent occurrence on the guitar is when a player strikes a note, and toggles between pickups while the note sustains. Jimi Hendrix used this technique on the song "Voodoo Child (Slight Return)." The pickups pick up different overtones, and players may deliberately manipulate the volume knob for one pickup, so often one will sound louder than the other. Hendrix also frequently used a Uni-Vibe pedal that gave his solos a general "pulsing" sound. For either of these effects, lightly placing the tongue on the reed as low as possible, where it touches the lower lip, will muffle the tone slightly, and reduce some of the higher overtones in the sound. Saxophonists and clarinetists have used this technique for years to "ghost" certain notes, playing them with a subtone quality as a stylistic choice. This tongue-dampening effect can also substitute for alternate fingerings on notes where alternate fingerings do not exist (the "long" notes on the clarinet or bass clarinet), for example the low concert E♭ "echo" effect produced by the Univox EC-80 unit on the final note of "Eruption."

Picking and Legato Playing

Guitar players are able to rapidly pick back and forth up and down over the strings at speeds of over 15 notes per second (sixteenth-notes at 250bpm). Thankfully, none of the solos in this study go that fast, but clarinetists have a few options when it comes to rapidly-picked passages. If the strings are left to sustain between picks, this creates a legato sound, and could just be slurred. If, however, the picking is more "staccato," then clarinetists must double-tongue. In my opinion, the way to produce the fastest staccato double-tongue is to touch the tip of the tongue to the tip of the reed as one would in single-tonguing, but the second articulation is a "ka" syllable: "Ta-ka-ta-ka-ta-ka." It probably goes without saying that this takes practice, especially when attempting to coordinate it with finger movement.

Tremolo picking, or "double picking" is simply moving the pick back and forth over a single string as rapidly as possible. On the clarinet, this can be achieved by double-tonguing, but

tremolo picking often has a more legato, sustained sound, so another option is moving the tip of the tongue up and down over the reed in a motion similar to the guitar pick. Dameian Walsh, a saxophonist formerly in the Vancouver-based band "Five Alarm Funk," calls this "double-sided double tonguing,"[207] whereas clarinetist David Pino calls it "on-the-reed multiple tonguing."[208] In either case, the tongue goes up past the tip of the reed, then back down past the tip again.
For faster tremolo picking, flutter-tonguing may be necessary. Flutter-tonguing is executed in two ways: One, by rolling the tip of the tongue while playing, similar to how one would roll their Rs in Spanish, or two, using the back of the tongue, similar to the uvular pronunciation of Rs in German. Gleb Kanasevich explained that his approach to rapid tremolo picking utilizes several different manners of flutter tonguing.[209] Lastly, if the tremolo picking is extremely legato, or in a range where any of the above techniques pose an extreme articulation challenge, alternate fingerings/timbre trills could produce the desired result.

For legato playing, guitar players use several techniques. The "**hammer-on,"** despite its name, creates a soft-attacked tone by bringing the tip of a finger on the fretting hand down onto a fret hard enough to cause the string to vibrate; the "**pull-off"** achieves a similar tone by pulling the tip of a finger sideways off of a fretted note. When **"Tapping,"** the hammer-on and pull-off are used in conjunction with the picking hand, which "taps" on different frets (essentially pick-handed hammer-ons). Tapping allows players to perform rapid passages, playing the neck of the guitar like a piano keyboard. On the clarinet, players can easily achieve these legato attacks: by slurring everything.

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[207] Dameian Walsh, "Dameian's Five Alarm Fun-Style Double Sided Double Tonguing," *Canadian Musician* 35, no. 4 (July 2013): 29
[208] David Pino, *The Clarinet and Clarinet Playing* (Mineola, NY: Dover Publications, 1980), 94.
[209] Kanasevich, interview.

Pitchless and Semi-Pitchless Sounds

The electric guitar is often used as a rhythm instrument. As mentioned in the discussion of Mother Maybelle Carter, the "rhythm guitar" is a role in many rock bands. Therefore, guitarists have come up with several techniques that emphasize more rhythmic sounds. Guitarists will often muffle or mute the strings with their fretting hand, preventing the strings from vibrating, but not pressing hard enough to fret them as notes. Strumming these muted strings creates a short, raspy sound, like a snare drum hit, or more analogously a scraped guiro. For this sound, the best technique is the one Derek Brown uses for his "snare" sound, which he calls a "pop." "That's basically just creating some tension in your mouth, and then releasing it [demonstrates 'pop' sound] with a ton of air."[210] I think this sounds nearly identical to the muted-string strum. The "pop" is more challenging on the soprano clarinet than the bass clarinet. It works better on lower notes of the soprano clarinet, but it takes practice and experimentation on both instruments with lip placement on the mouthpiece and reed to avoid simply squeaking.

A related technique is called the **rake**. The rake is similar to the muted strum above, except that the player uses the side of their picking hand to mute the strings as they strum or "rake" over them until they get to the note they want to play, which is not muted. This is tricky to imitate on the clarinet, but one possibility is to do a very short, pitchless flutter-tongue immediately followed by playing the (pitched) note.

Another picking technique involves **palm muting**. Palm muting is used frequently in metal music to gain clarity when using extreme fuzz distortion, but also for a different color of staccato attack. The side of the pick hand is also used, but it does not contact the string hard enough to fully prevent it from vibrating (nor lightly enough to produce a pinch harmonic). The note still sounds, but muted with little sustain. What clarinet technique can get the hard attack of a guitar pick, but

[210] Derek Brown, "How to "BEATBoX" on the Sax - Overview - Derek Brown" (tutorial video), posted November 11, 2014, accessed July 19, 2021.

with a more subtle sound? In the opening of the track "Hide and Seek" from his album *Freedom In The Groove*, Joshua Redman gets a similar sound by essentially slamming his whole tongue against the reed, similar to the "tongue-ramming" technique used by flutists on their embouchure hole. Unfortunately, in my case at least, I have been unable to replicate this sound on the clarinet or bass clarinet. The tenor saxophone likely acts as an amplifier more so than the clarinet. I can get closer by removing the mouthpiece of either instrument, but this is not practical unless an entire solo consists of palm muting. This leaves "slap" tonguing. Slap tonguing pulls the reed away from the mouthpiece so that when it snaps back, it provides an aggressively sharp attack. With practice, the note following the slap tongue can be as loud or soft, as long or short as the player wishes.

The **pick scrape** is another challenging sound to recreate. It is a "semi-pitched" sound created by, per the name, scraping the edge of the pick down one of the wound strings on the guitar. As the pick passes over the winding ridges, it produces a scraping sound that lowers in pitch as the pick travels down the fingerboard. The fretting hand can also create a similar sound by sliding down the fingerboard without pressing the strings down. If the scrape or slide is a long one, the best way to imitate it is by holding a low note and singing a glissando descending from a high note. If the scrape is a quick one, the closest sound in my opinion is to make a "kissing" sound through the instrument. By significantly puckering the lips outward and having them meet at the tip of the mouthpiece, the player can achieve a strong suction to make the sound. The outer portions of the lips should stay in contact with the mouthpiece so that the instrument itself amplifies the sound.

The next sound is, for guitarists, usually unwanted. It is the sound of the pick touching the string and creating a "chirp." This happens to a small degree every time a player picks a note, but with certain picks and in certain circumstances it is more prominent.[211] I noticed it in Randy Rhoades's solo in Ozzy Osbourne's "Mr. Crowley," as well as Eddie Van Halen's solo in "You

[211] Troy Grady, "Perceiving Pick Noise: Can You Hear The Chirp? 16 picks compared!" (instructional video), posted July 19, 2019, accessed July 24, 2021, https://youtu.be/IdQ-Yn6k-To.

Really Got Me." In their case, Rhoades and Van Halen are both such skilled guitarists, the chirps were likely intentional as another effect. The sound is that of an extremely high grace note preceding a lower main note. These could be played exactly that way, slurring (and voicing) from a high note quickly down to the melody tone. However, I wondered if I could achieve the sound the same way the guitar players do. If I hold the mouthpiece with my lips alone, and touch my bottom teeth to the reed while holding a note, I get a similar chirp that returns to the original note when my teeth are not in contact with the reed. The type and shape of pick that a guitarist uses affects how much of this chirp they get. Similarly, the shape and even "sharpness" of the lower teeth seems to affect the chirp on a clarinet. I have sharp lower teeth, so I often play with tape or something similar over them to protect my lip, but this "chirp" effect is easier when my teeth touch the reed directly.

An easy semi-pitched sound is an effect that guitarists use after picking a note. It is called the **vibrato bar flutter** and is simply executed by grazing the vibrato bar with the picking hand. The springs that pull the bridge back into place shake, producing an oscillating sound that can actually best be compared to a flutter-tongued note on the clarinet. The execution here goes without saying. Typically, the flutter happens in the middle of a note, after it is picked, and only lasting a split second.

The final technique that I believe fits in this category is the "fade out" at the end of a song. The clarinet can arguably play softer than any other wind instrument, literally to *niente* ("nothing"). If done carefully, the clarinet can fade at the same pace as the song or solo being imitated. Examples of this would be "Hotel California" and "Free Bird." Both songs fade out during the guitar solos.

Jimi Hendrix's "Star-Spangled Banner" has several moments that belong in this category. In the sections after, "And the rockets' red glare" and "The bombs bursting in air," the sounds coming from Hendrix are chaos. Highly distorted chaos. In Heather Roche's blog post "…On Singing and Playing," she concludes with audio examples of a low C on bass clarinet combined with flutter

tonguing and singing; combined with a spectral multiphonic and singing; and with flutter tonguing, a spectral multiphonic, and singing.[212] They can only be described as "highly distorted chaos." If I were to attempt Hendrix's revolutionary solo, I would use a combination of these sounds.

"Extended techniques are messy by design, exploring the chaotic aspects of instruments."[213] – Matthew Burtner

Pedals

Pedal effects are trickier to imitate or recreate, but not impossible except perhaps for one. Of the pedals mentioned in Valdez's dissertation, the Wah-Wah is the only one that does not seem to have an analogue on the clarinet. The **chorus effect** outputs signals that are slightly different in terms of timing and tuning, sounding like multiple guitars. The effect sounds similar to the "double tracking" technique that gave The Beatles their sound on the album *Revolver*. This effect could be emulated by using two clarinets playing in unison. The difficulty of the music would determine the feasibility of this sound. The effect of the **phase shifter** is similar, but sounds like the equalizer is being steadily modulated. To a subtle degree, changing the shape of the oral cavity to change the overtone spectrum of a note achieves this, including moving the tongue, puffing the cheeks, biting the reed, and touching the tongue to the reed. The **echo/delay** can be imitated to a limited degree by simply repeating the final notes with decreasing dynamic levels. Two clarinetists could achieve an effect like the "Echoplex" section of Brian May's solo from "Brighton Rock" by Queen, essentially playing in cannon.

In many recordings, especially those of Jimi Hendrix, one can hear "panning" from the left to right channels. While there may be some pedals today that achieve this, in Hendrix's case, this seems to have been done in post-production mixing.[214] During a performance, the player may wish

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[212] Heather Roche, "…On Singing and Playing," posted May 27, 2014, accessed July 20, 2021.
[213] Burtner, "Making Noise."
[214] John McDermott, Eddie Kramer, and Billy Cox, *Ultimate Hendrix: An Illustrated Encyclopedia of Live Concerts and Sessions* (New York: Backbeat Books, 2009),102

to memorize the solo, or have portions of the solo printed twice and placed on two music stands: one to the right and one to the left. Then the player can literally turn to the left and right while performing. This may be more of a visual effect than an auditory one, but anyone who has seen a guitarist perform knows: how the performer moves is 90% of the experience.

Practical Considerations

A guitarist can breathe while they play, and thus can play continuously for as long as their fingers can keep moving. For these longer passages, a clarinetist may need to employ "circular breathing." Circular breathing involves puffing the cheeks while playing, then closing off the mouth using the back of the tongue against the soft palate. The player quickly inhales through the nose while the air in the cheeks is pushed through the instrument. Finally, the back of the tongue drops as the soft palate closes the nasal passageway, and normal exhalation resumes. Because of the role of the back of the tongue in circular breathing, it cannot be done concurrently with certain multiphonics, including spectral multiphonics, or while performing "ta-ka" double tonguing. However, with practice a player can circular breathe while performing on-the-reed double-tonguing.

The other huge practical consideration is range. The lowest note on the guitar is sounding E2 (or E♭2 or D2 depending on how the sixth string is tuned). This is nearly an octave lower than the B♭ soprano clarinet. The highest fret of a 21-fret guitar is C♯6 (E6 for a 24-fret guitar), and I have heard pinch harmonics up to C7. In fact, the final note of the solo in "Stairway to Heaven" is a D6, but a D7 overtone is clearly audible. The best clarinetists can barely hit that note with consistency, and though the Alder, Bok, and Sparnaay charts go up to B6, B♭6, and B♭6 respectively, this is surely even harder than on soprano clarinet, and "shredding" (playing extremely fast, virtuosic passages) that high is…unlikely. Some guitar solos fall within the range of the soprano clarinet, and some go low enough to necessitate the bass clarinet, but have sections that are playable (or at least feasible) in the higher registers. Some solos switch from one range to another in large enough

sections that they could be performed by a duo of bass clarinet and soprano clarinet (and possibly E♭ clarinet). In one of the solos in Appendix A, the E-flat clarinet is the only practical clarinet that can perform the solo because it is simply too high for the B-flat clarinet to play with any kind of control. Less ideal is the solution of Bobby Yang and Jill of Unlucky Morpheus, either raising the notes that are too low for the soprano clarinet up an octave, or dropping the notes that are too high for the bass clarinet down an octave.

What about "Eruption"? A perceptive listener will note that Van Halen's first bar dive drops to concert B♭1. This is the lowest note on the extended bass clarinet (written low C3), though it would require careful manipulation of the lowest keys to achieve anything resembling a glissando. The next bar dive, however, drops to a concert A♭1, and as previously mentioned the one after that descends to a concert D1, only five half-steps above the lowest note on a standard 88-key piano. While the rest of the solo seems almost impossible anyway, this range issue is prohibitive for a true recreation. But it got me thinking: What if I could make a kind of "whammy/dive bar" for the bass clarinet?

My first thought was to attach something to the bell that could inflate and get longer. But how would it inflate? And it would also have to deflate to achieve the ascension after the dive. My second idea was to find a way to free up a hand and slowly insert something into the bell. After looking at various clamps and bands, I finally experimented with a piece of coated coat hanger wire. What I came up with could hang from the neck strap ring when not in use (Figure 20), and be pulled over the left hand keys to close them (Figures 21 & 23). The left hand first finger vent hole would need to be sealed with tape (Figure 22).

Figure 20. Bass Clarinet Clamp (Not in Use)

Figure 21. Bass Clarinet Clamp, Back

Figure 22. Bass Clarinet Clamp, Front

Figure 23. Bass Clarinet Clamp, Side

This seemed an elegant solution, until I realized that there would be no place to install it for any of the bar dives. Not only that, when I tried to insert a piece of PVC pipe (after plugging the vent hole in the bell), rather than gradually lowering, or even immediately lowering the pitch, it caused a squeak right before sealing against the inner bore of the bell. This could possibly be done quickly, but I would not want to risk damaging the bell.

My next thought was to put something in the bell that would telescope out. I purchased a three-piece telescoping plastic toy alphorn and secured it to the bell using picture-mounting putty. While standing and holding the bass, I tried to use my bass clarinet stand to hook the "bell" of the alphorn, and then lower the instrument thus telescoping the horn. Two things happened: the pitch barely changed, and the mounting putty unstuck. Plus, I still would have needed a free hand to collapse it again. I believe the reason the pitch did not change was because the horn was conical. It essentially acted like a longer bell. I needed something of which the internal diameter stayed relatively the same.

This thought helped me discover the idea that got me as close to a bass clarinet bar-dive bar as I think I can get. I fit a 1" 90-degree elbow PVC coupling over a two-foot length of 1" schedule 40 PVC pipe (Figure 24). If I remove the bell from my Buffet Prestige 1193 bass clarinet, the coupling fits over the tenon of the lower joint (one may need to apply strips of tape to the inside of the coupling socket for a tighter fit). Then I slid a two-foot length of 1 ¼" schedule 40 PVC pipe over the 1" pipe, and I had my slide. I tried playing a written low C3, and a written low F♯2 (F-¾-sharp2) came out instead. Imagine my excitement in discovering that by resting it on carpet and using a rubber-soled shoe, I could slide the end of the pipe out and get a low written E♯2 (essentially the same concert D1 as Van Halen), with the capability of sliding it back in. Then imagine my frustration when I realized that that solution was under my nose the whole time. When discussing the range of the clarinet in his book, Phillip Rehfeldt states:

> The "classic" downward extension of the clarinet's range occurs in Donald Martino's *B,a,b,b,it,t* (1996). The work, written for B-flat soprano clarinet, calls for a set of nine tubes—the majority of which slide, producing a portamento/glissando effect—constructed from instructions provided by the composer. These are inserted in the end of the instrument, minus the bell, and operated by grasping the tubes with the knees or by catching the end on the rim of the shoe and raising the leg.[215]

At least I had invented a key-clamp that could be used in other works or compositions (it allows low C-to-C♯ trills to be possible). This experimentation was also in the spirit of Bo Diddley, Jimi Hendrix, Eddie Van Halen, and Steve Vai, all of whom altered their guitars to get the sound(s) they wanted (Eddie Van Halen's guitar was even dubbed the "Frankenstrat" by his fans).

Figure 24. Original PVC Bass Clarinet Extension

What this passage did *not* provide me with was the solution to the other bar dives. Because this telescoping PVC "bell" extended directly from the lower joint, the written C3 of the first bar dive would no longer be possible. The solution here was to exchange the 90-degree elbow joint for a 1" SxSxS tee coupling (three sockets in a "T" shape). This made my lowest note a C♯3, so I added a 1" 90-degree street elbow fitting, and that lowered it just enough for a (slightly sharp) C3 to come out (Figures 25 & 26). In performance, once I key-glissed down to the C3, I could then quickly stop up the rear-facing socket with a rubber plug, allowing me to perform the E♯ bar dive (Figures 27 & 28). The only consideration with this "whammy bar" is that it is not possible to use a peg on the bass, and thus it could not be performed standing, either. Therefore, finding a chair of proper height is essential. This leaves only the second dive to solve.

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[215] Rehfeldt, *New Directions*, 6.

Figure 25. PVC Bass Clarinet Extension with Low C Vent

Figure 26. PVC Bass Clarinet Extension, Disassembled

Figure 27. PVC Bass Clarinet Extension Assembled to Instrument

Figure 28. PVC Bass Clarinet Extension Fully Extended

The written B♭2 is also no longer possible, as the next lowest note I could get below written D3 would now be that F♯2. Derek Brown has a video on what he calls "Tartini tones," also known as "combination tones."[216] By playing a concert A2 at 110Hz, and singing a concert E3 at 165Hz, the resulting tone would be an A1 at 55Hz (165 minus 110). Brown demonstrates several of these, and the effect is astounding. His tenor saxophone achieves pitches that are lower than the tessitura of the instrument, sounding like a baritone saxophone. However, the tones he gets do not sound like the difference tones that our ears perceive when two flutes play a high interval together. His tones sound like they are actually there, and indeed, they are. I reached out to Dr. Joe Wolfe, a physicist and composer who works for the Acoustics Lab at the University of New South Wales. The Acoustics Lab has an article about Tartini tones, and I wondered if he could explain the phenomenon from Brown's videos. He said these are what he calls "heterodyne tones," which are

[216] Derek Brown, "'Tartini Tones' BEATBoX SAX Tutorials," posted February 3, 2015, accessed July 15, 2021, https://youtu.be/8IUhJw5dIQU.

notes that occur when two frequencies directly interact with one another. (The definition for "heterodyne" in electronics is, "Relating to the production of a lower frequency from the combination of two almost equal high frequencies, as used in radio transmission.")[217] The Acoustics Lab has investigated these tones when produced by didgeridoo players, and after my email, Dr. Wolfe revised the lab's page on Tartini tones to include a section on heterodyne tones.[218]

In the case of saxophone or clarinet, the reed is being driven by periodic signals from both the vocal cords and the resonant frequency of the instrument. Putting the above example a different way, if the instrument drives the reed at 110 cycles per second, and the voice vibrates at 165 cycles per second, they only "line up" every 55 cycles per second. This phasing creates a new tone at 55Hz. This is a gross oversimplification (and in the mind of a physicist is thus inaccurate), but for the purpose of this study, it explains enough to understand the principle. It probably goes without saying that these interacting tones produce a highly distorted sound, which for this investigation is a desirable side-benefit. One way to experience this is to create a sine wave at 110Hz and one at 165Hz, and playing them through the same speaker.[219] A 55Hz tone will sound. Mute one or the other, and the heterodyne tone will disappear leaving only the unmuted frequency. However, panning one tone to the left speaker and the other to the right, both tones are still audible, without the heterodyne tone. Only when the tones are interacting in the same system, i.e. the same speakers or the same instrument, does the heterodyne tone appear. This is why a bass clarinet playing A2 and a singer singing E3 does not produce A1.

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[217] Lexico, s.v., "heterodyne," Oxford Languages, accessed July 26, 2021, https://www.lexico.com/en/definition/heterodyne.

[218] Joe Wolfe, "Tartini Tones and Temperament: An Introduction for Musicians," UNSW Acoustics Lab, last updated July 2, 2021, accessed July 3, 2021. https://newt.phys.unsw.edu.au/jw/tartini-temperament.html.

[219] Using a DAW, or the website used to create the square waveforms above: https://meettechniek.info/additional/additive-synthesis.html.

A bass clarinet playing a written B♭3 and the player singing a written F4 (sounding E♭3), however, will produce a written B♭2, or concert A♭1, the note of the second bar dive. The trick here is to start both the voice and the instrument a fifth higher, then glissando/dive down to written F4 sung over written B♭3. The closer the voice can come to a precise perfect fifth, preferably throughout the glissando, the more clearly the low tones will sound. One thing to keep in mind as well: the performer may not actually hear the heterodyne tone. The audience may hear it, and it may be clear on a recording, but in my experience the tone does not resonate as effectively in my own head during execution.

The final practical consideration is simply speed. By nature, these techniques are idiomatic to the guitar. The guitar also responds almost instantly, and relatively evenly, unlike the clarinet, and especially the bass clarinet. Even if a player's fingers can move that fast, some excerpts like the tapping section of "One" or "Eruption," simply would not sound good at the tempos at which they were originally performed. Additionally, some voicing changes and awkward fingering changes cannot be executed quickly. Say a guitar player rapidly alternated between the low E string and a high harmonic on the adjacent string. This could be done extremely quickly and with relative ease. On the bass clarinet, however, this would simply be impossible. It would either squeak, or the fingers or tongue speed or both would be limiting factors. That said, I believe many guitar solos are possible near the performance tempo, and if they are not, the effect, style, and mood can still be achieved at slower tempos.

V. Solo Selection

Selecting which solos to transcribe was a substantial task. As I mentioned in the introduction, as this research was coming to a close, *Guitar World* published a *new* readers' poll online, titled "The 50 Greatest Guitar Solos of All Time," written by the editors of *Total Guitar* magazine (which was acquired by *Guitar World* in January, 2020).[220] Any links from prior to 2021 or searching on guitarworld.com now redirect to this article; the old list appears to be inaccessible. Like the previous list's top 50, each solo includes interviews, background information, and tips for how to play it. Like *Guitar Player*'s "40 Most Influential" list, it seems to only include one solo per artist.

Only 13 solos appear on both the 1998 and 2021 lists, and only six of those appear on *Guitar Player*'s "40 Most Influential": "Eruption," "Crazy Train," "Highway Star," Brian May's solo in "Bohemian Rhapsody," and B.B. King's "The Thrill Is Gone." These six could represent a statistical, poll-based approach, but this seemed too mathematical and certainly does not take into consideration the needs of the clarinet or the needs of an academic study. Because the *Total Guitar* list was not published until February of this year, the project was already underway. While several of the solos in this project are on their list, it was not used in the solo selection process.

I mainly relied on *Guitar World's* top 100 list, but with a few initial qualifications. Because the article contained more background information for the top 50, I only looked at songs in the top 50 that also appeared in Hal Leonard's transcription book. This narrowed the options to 44. The six songs from the original list that are missing from the book are likely due to complications with rights, or simply a lack of transcriptions, since the transcriptions were taken from previous issues of *Guitar World* magazine.[221] The next step was more subjective. I listened to each of the 44 songs several times and gave it a rating from 1 to 5 (5 being the "best"). The rating was based on its

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[220] *Total Guitar*, "50 Greatest." For the full list, see Appendix D.
[221] Hal Leonard Support, email message to author, July 21, 2021.

feasibility (though I wanted to push that concept with this project), whether or not I thought it would sound good on the clarinet, how complex the solo was, and bottom line, how much I liked it. Some of the guitar solos that got a "1" were great songs, but the solos did not suit the needs of this project. As mentioned previously, Nirvana's "Smells Like Teen Spirit" merely repeats the melody one time on guitar; the solo on Dire Straits's "Sultans of Swing" has a small range and the only techniques it uses are bending and vibrato.

Songs like "Sharp Dressed Man" by ZZ Top or "Pride and Joy" by Stevie Ray Vaughan are examples wherein the guitar has so many dyads and triads, they would not really work as anything less than a duet. Of course, duets and trios are not off-limits; in "Free Bird," Allen Collins is playing a duet with himself, so a transcription would require that as well.[222] Finally, songs like "Surfing with the Alien" by Joe Satriani and "Cliffs of Dover" by Eric Johnson are full-length instrumental tracks that consist *entirely* of solo guitar. These would be challenging and excessively time-consuming, but incredibly fun to try to pull off. After the first pass, I had 26 "finalists" with a 4 or 5 rating. In addition, I included Tom Morello's solos from "Like a Stone" by Audioslave and "Bulls on Parade" by Rage Against the Machine. Morello's innovations on the guitar rival those of Hendrix and Van Halen before him. "Bulls on Parade" is number 23 on *Guitar World*'s "100 Greatest" list, but not included in the Hal Leonard transcription book. I also could not help but include the *TV Gospel Time* performance of "Up Above My Head" by Sister Rosetta Tharpe.

The final step was to go through each solo with a fine-toothed comb. Due to the range issue mentioned above, some of the solos from *Guitar World*'s list were eliminated simply because they went too low for the soprano clarinet, but were too technical in the high register for the bass clarinet. Steve Vai's "For the Love of God," Joe Satriani's "Surfing with the Alien," Jimi Hendrix's

[222] *Guitar World* editors, *100 Greatest*, 13.

solo on "Machine Gun," and Carlos Santanta's "Europa" fit into this category. Hendrix's "Star-Spangled Banner" also fit into this category, but was also number 52 on the list.

A few songs were eliminated because they actually used techniques that were impossible. Tom Morello in particular uses a "whammy pedal" that he can set to bend a note a full octave or even two octaves. Perhaps with practice a clarinetist somewhere can achieve these glissandos at the speed Morello presses and releases the pedal, but this was beyond the scope of this study. One curious potentially-impossible-to-replicate case was in Keith Richards's solo from "Sympathy for the Devil." The tone is bright, chirpy, and as piercing as one can hear in any of these solos, likely run through an AC30 amp "with bass set to zero, which explains the spiky tone."[223] I tried putting pieces of wax paper between the reed and the mouthpiece, long pieces of wax paper down the bore, a metal chain down the bore, placing the reed 1/16" lower on the mouthpiece, cutting slits in the tip of the reed, breaking off bits of the tip of the reed, and even cutting the reed clean in half lengthwise and clamping them together with the ligature.[224] I have heard this sound before in some middle school band rooms, so I thought one of these things would replicate it, but I learned that—at least in the hands of someone who has been playing the clarinet for nearly three decades—the clarinet wants to sound like a clarinet. The one thing that came close was to sand one corner of the reed down until it was nearly transparent, but even this made the instrument more likely to squeak (jump up to a higher partial and stay there) than to chirp (retaining the fundamental after the initial attack).

I also used the opposite approach to solo selection: instead of cutting out solos that seemed impossible, I looked more closely at solos that had the techniques I knew *were* possible that would represent a wide array of sounds for this project. What serves this project best are transcriptions at a variety of levels that include a variable amount of additional techniques. In the end, I settled on five

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[223] *Total Guitar,* "50 Greatest," 2.
[224] Surprisingly, this "split reed" played decently.

solos: "All Along the Watchtower," "Stairway to Heaven," "Up Above My Head," "Bulls on Parade," and yes, I made an attempt at playing "Eruption" on the bass clarinet.

Instrument Selection

In addition to choosing which solos to include, which techniques to play, and even which instrument would fit the range of the solo best, was choosing which instrument would sound the most "authentic" when playing the solos. Cornelius Boots explored this as well:

> I do think that the bass clarinet is a little bit better because of the range. What I picture is cello, guitar, bass clarinet; we all have the same four octaves essentially … whereas the traditional concerto instruments, whether it be violin, trumpet, flute, B-flat clarinet, etc., they're an octave too high because they have to sail over the orchestra. … It just feels more like that, if you're up at the top of the guitar, you can tell you're getting to an extreme of its range, whereas if you play those same notes on B-flat clarinet, we're not at the extreme, yet. We're in there all the time.[225]

The tone definitely loses something in its intensity when a note played at the 17th fret on the high E string is a middle-register note that most clarinet students can play by the end of sixth grade. On the bass clarinet, however, even professional players would approach this note (written B above the B above the staff) with caution. Is sounding "hard to play" an aspect of the music itself? Context can certainly be the guide here. If the higher notes were mostly harmonics played by lightly touching a string, perhaps the soprano clarinet would be best. If the guitarist played high notes by bending a note up a minor third on a high fret, the bass clarinet may give that extramusical intensity to the solo. In order to demonstrate this, I have included both a soprano and bass clarinet version of "Stairway to Heaven."

[225] Boots, interview.

VI. Performance Guides

A project like this really exposes the limits of the western classical musical notation system. Not only are the stylistic elements impossible to transcribe, many extended techniques simply do not have a consistent form of notation. Jazz musicians have been transcribing solos as long as there have been recorded solos to transcribe, and they understand that any transcription is not an end in itself but a means to help a player understand the recording. Even if someone tried to be as accurate as possible, it would reach a point of diminishing returns: "Ironically, the more the transcriber travels in the direction of accuracy and precision, the more he or she departs from a score that may actually have been used in performance or one that may easily be read and interpreted in the future."[226] Therefore, the recording is required as part of the learning process.

I would like for players to be able to use the transcriptions along with Chapter IV to experiment and find solutions for themselves, but the guides below can be a starting place. Keep in mind that they are each only one possibility for how to play the solo. Other players could very well find better multiphonics (according to Rehfeldt, there are "373,248 possible finger combinations on the clarinet, not including half holes, most of which are capable of producing distinctive sounds"), or think their flutter-tongue is more effective on a note than growling, or even discover some way to modify the instrument to get more distortion (or the sound in "Sympathy for the Devil").[227] Virtually every book, dissertation, or article on extended techniques has a disclaimer stating some version of: "No two players are the same. They also may have different equipment, and different reeds that are played at different altitudes or in different humidity levels. Even two instruments of the same model will not necessarily sound the same. What works in one set of conditions may not work for

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[226] Mark Tucker, rev. Barry Kernfeld, "Transcription (ii)," *Grove Music Online*, January 20, 2002, accessed July 26, 2021, https://www-oxfordmusiconline-com.ezproxy.library.wisc.edu/grovemusic/view/10.1093/gmo/9781561592630.001.0001/omo-9781561592630-e-2000454700.
[227] Rehfeldt, *New Directions,* 21.

another." Use these suggestions as a basis for experimentation. My suggestions may very well work in most situations, but I cannot guarantee that they will work for anyone but myself, with this reed, on this warm, slightly humid summer day in Madison, Wisconsin.

With that out of the way, however, Rehfeldt, Farmer, and Gerard Errante have all said, concerning multiphonics, no change or adaptation to the equipment from what is used for traditional performance techniques is necessary to produce them.[228] Cornelius Boots admits that "you might have a different mouthpiece/reed/ligature," but for him it is "in terms of blending with other people, and tuning, and timbre priorities and stuff like that."[229] Other than that, a few clarinetists and saxophonists, including Derek Brown, prefer using plastic/synthetic reeds for slap tonguing because they find it easier to use suction to pull it down away from the mouthpiece.[230]

Many of the solos are "straight forward," for lack of a better term, with few extended techniques besides some bending and vibrato. "Stairway to Heaven" and "All Along the Watchtower" are closer to this end of the spectrum. This does not mean that they are easy. As I also discovered, the stylistic elements that sound so natural to guitarists like bend rate, timing, note choice, vibrato use, etc. take repeated listening and practicing to perform correctly. Muddy Waters once said, "My blues looks so simple, so easy to do, but it's not. They say my blues is the hardest blues in the world to play."[231] When discussing the rock-influenced music he wrote, Cornelius Boots explained:

> [I] played as a bass player with a drummer, on bass clarinet … for a long time. So my riffs, as simple as they are, you can play what's written, but they don't sound right because the player

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[228] Rehfeldt, *New Directions*, 43; Farmer, *Multiphonics*, 15; Gerard Errante, "Clarinet Multiphonics: Practical Applications," *Clarinet* 3, no. 2 (February 1976), 5.
[229] Boots, interview.
[230] Derek Brown, "Slap Tongue pt.1 BEATBoX SAX Tutorials" (video tutorial), posted December 2, 2014, accessed July 19, 2021.
[231] Palmer, *Deep Blues*, 103.

> hasn't done that. That's the beauty of a lot of these guitar guys, they're doing bass, they're playing with the drums, they're doing high melodies, they're really flexible, malleable.[232]

Boots emphasized that along with a deep stylistic familiarity with the music, a player must have a range of articulation, "deep-rootedness" in breath, and rhythmic integrity. Boots states that in classical music,

> We're only called to use a small amount [of articulations], maybe 6-10 … whereas in our arrangements [for Edmund Welles], when you're really doing them correctly there's at least a dozen, maybe more than that; nuances in terms of 'ta' vs 'da' vs 'thuh.' It's not an accent or a marcato or a staccato. There's a lot more complexity, and if you can hear it, you can do it without necessarily explaining it.[233]

He also commented that working with rock and heavy metal styles will *improve* the range of articulations, breath support, and rhythmic integrity helping a clarinetist "open up as a player."

All of this speaks to the importance of the "gestalt" of the solo. What I heard as "too classical" in some of the renditions other players have done, may simply be that in trying to be as accurate with their transcribing and playing as possible, they lost the big picture of what the solo was trying to express. The rapid technique and extended techniques should never get in the way of that big picture idea, the gestalt. Even in the guitar world since the 1980's, "Although some of these [modern] players have developed a virtuosic technique that is, in some respects, beyond the pioneering achievements of Eddie Van Halen, few are able to deploy their skills with comparable rhetorical success."[234] This was why Bobby Yang's solo on "Hot for Teacher" seemed less "singable" to me.

I will add this: I think I can say, due to the nature of this project, that playing these sounds in real time on the clarinet is challenging, probably even more challenging than doing them on a guitar. However, part of the point of learning these solos *is* the virtuosity. "The guitar hero is a master of

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[232] Boots, interview.
[233] Boots, interview.
[234] Walser, "Eruptions," 299.

his instrument, possessing the technique necessary to play musical passages outside the reach of other musicians."[235] This is true for the "clarinet hero" as well.

A few practical notes. Measure numbers in these guides refer to the transcriptions in Appendix A. The "first," "second," and "third" fingers refer to the index, middle, and ring fingers. Pinkies and thumbs named as such. I refer to the side keys in order from bottom to top. The E♭ side key is 1, F♯ side key is 2, etc. Fingerings used in this section were created using Bret Pimentel's "Fingering Diagram Builder" at https://fingering.bretpimentel.com/.

[235] Waksman, *Instruments of Desire*, 240.

"All Along the Watchtower"

Jimi Hendrix's cover of Bob Dylan's "All Along the Watchtower" contains several solo sections utilizing several techniques. Besides the opening, he plays a short solo at the 52-second mark, a much longer solo about halfway through, and ends with a guitar solo as well. The section starting at the two-minute mark is in octaves with an echo effect (applied in the mixing phase), at the 2:15 mark Hendrix liberally applies the wah-wah pedal (still with an echo), and at 2:32 he strums chords. Unfortunately, all three of these sections would be hard or impossible to recreate, so this transcription focuses on the other solos.

One of the techniques utilized the most in "All Along the Watchtower" is vibrato. As much as possible, the note should be fingered a quarter-step sharper and lipped down to pitch. The E5 in m. 1 can be raised by swapping the second and third fingers of the right hand (Figure 29); the A4 in m. 3 can be played sharp by using the throat G♯ key and side key 3 (Figure 30). The D5 in measure 5 is made sharp by adding the E♭ and B pinky keys (Figure 31), though it still needs to be lipped down slightly, and the F5 in m. 9 is played with right-hand second and third fingers (Figure 32). Measure 12 can be played by lipping a first-finger F♯ down to an F, and coordinating a lip up while lifting the finger up to a G. The D4 in m. 14–15 can be raised by adding side key 1 and the C♯ pinky key (Figure 33). Adding the G♯ pinky key raises the A5 in m. 18 (Figure 34).

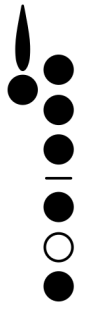

Figure 29. E-quarter-sharp5

Figure 30. A-quarter-sharp4

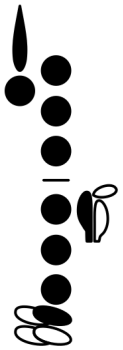

Figure 31. D-quarter-sharp5

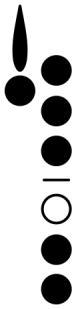

Figure 32. F-quarter-sharp5

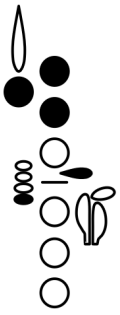

Figure 33. D-quarter-sharp4

Figure 34. A-quarter-sharp5

The vibrato in mm. 22–27 can be done by using the "chewing" vibrato. Because of the unison effect, the direction of the vibrato is less important here. Lastly, if the embouchure is switched to a double-lip embouchure in m. 28, then the wider vibrato on D6 in the rest of the solo can be done with the "shake" technique.

Generally, bends are done with the fingers or jaw in this solo. The alternate fingering for A4 in m. 12 can be done by using only side key 3. I simply lip the D5 in m. 11 down, and A4 in m. 11 is lowered by adding the first, second, and third fingers of both hands (Figure 35). As the score states, Hendrix plays a (written) D5 at the end of measure 12, but the effect is much more fluid if the fingers slide to up to a "throat" C (Figure 36).

Figure 35. A-quarter-step-flat4

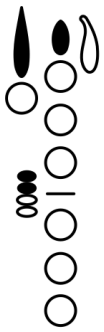

Figure 36. "Throat" C

The outro has three additional techniques. The "unison" notes beginning in m. 22 are replicated by singing and playing the same notes at the same time. For the bends, I use only my voice while keeping the clarinet pitch constant. The A5 at the end of m. 29 is just about the limit of my singing range, so this may be a consideration for other players with lower vocal ranges. As previously mentioned, this solo ends with a "panning" effect going from the left to right stereo channels. The transcription contains instructions for when to turn which direction. Additional copies may be placed on stands around the musician to facilitate reading, though this section is easy to memorize. Lastly, the song does a fairly rapid fade to nothing, which can be done by simply playing to *niente* on the clarinet.

"Stairway to Heaven"

Jimmy Page's solo from "Stairway to Heaven" is a well-constructed, singable melody, far from simple "shredding," but still nearly entirely improvised: a "song within a song."[236] "Stairway to Heaven" may be the easiest solo in this project…for soprano clarinet. On bass clarinet, it becomes a whole other beast. I will start with the soprano version.

As in classical music, grace notes are played before the beat. Where I have notated sixteenth notes on a downbeat sliding to a different note, this is played as a grace note **on** the beat. The bend from A♯4 to B4 in m. 2 is most effective when the B is played with side key 3, pressing the key close to where the right hand index finger connects to the hand (the metacarpophalangeal joint) so that the other fingers can quickly play the subsequent D5s. The bend into B4 in m. 3 is tricky. It can either be lipped slightly down, or simply played as a B♭ grace note. Unfortunately, neither solution is ideal. I play the upward bends from E♮ starting at the final note in m. 4 similar to the way a guitar player would play them: by extending my left hand index finger, sliding it off of the tone hole to my right (though I encourage a player to try flexing the finger to the left, or sliding it down toward the bell to see which is the most comfortable and effective). The bends in m. 9 are all done with the right hand index finger. The bend in m. 15 can be done by sliding the right index finger off of the tone hole. Adding the right hand sliver key to the middle-finger F♯ will raise it a quarter-step, which can be lowered with the tongue, and the vibrato is then produced with the jaw.

The diamond-shaped note heads are all sung at the same time as the solid notes, which are played on the instrument. The B♭ on the downbeat of beat 3 of m. 5 can be a reference for the sung note at the end of the beat. The notes in m. 14 start in unison, but the written F♯5 is held underneath the A6 and B6. As in "All Along the Watchtower," the unison bend in m. 16 is done only with the voice.

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[236] *Total Guitar,* "50 Greatest."

The B4 in m. 17 can be played sharp by adding side keys 3 and 4 to the A at the end of m. 16. The B4 in m. 18 should also be played with a trill-key fingering. The B3 in measure 19 is raised with the right hand sliver key, similar to the F♯ in m. 15. I use the rest in m. 19 to take in more mouthpiece, then use "open" D in m. 20 followed by the notated harmonic multiphonic for the final note. It is fairly flat in pitch, but this fingering combined with significant biting can get out both a written E6, and E7. If they both do not come out simultaneously, a "pinch harmonic" effect can still be obtained by "squeaking out" the E7 as the note is ended.

The bass clarinet version is trickier, namely because many of the bends have to be done as key bends. In m. 3, I use "1-and-1+2" for the B5 bend (Figure 37), quickly raising the two fingers in my right hand for the bend. Usually, it simply sounds like a grace note. For the E♮ bends in m. 4–6, I also imitate the guitar, extending the middle finger of my right hand in a sliding motion. This can be a smooth motion, but it goes by so quickly that it does not matter if it sounds more like an E to F♯ 32nd note.

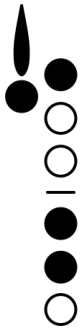


Figure 37. 1 and 1+2 B♭

For the high notes in measures 8 to the end, I recommend each player research their own fingerings. The internet, plus the Bok and Sparnaay books are good starting places, as well as a book called *Le Clarinette Basse* by Jean Marc Volta. I typically try to use "open" or "fake" high-register fingerings as often as I can. In a few cases, I sacrifice pitch for feasibility.

I "lipped" the descending bends in mm. 12, 13, and 14, and used the same "lip down a quarter-tone sharp" technique for the vibrato notes on the second page. Measure 20 is possible, but

at the original tempo the descending slurred notes sound more like a glissando when I play them. There is just not enough time for me to voice each individual pitch (without squeaking on one or all of them). Find a great E7 fingering for the last note and play it confidently, with no vibrato.

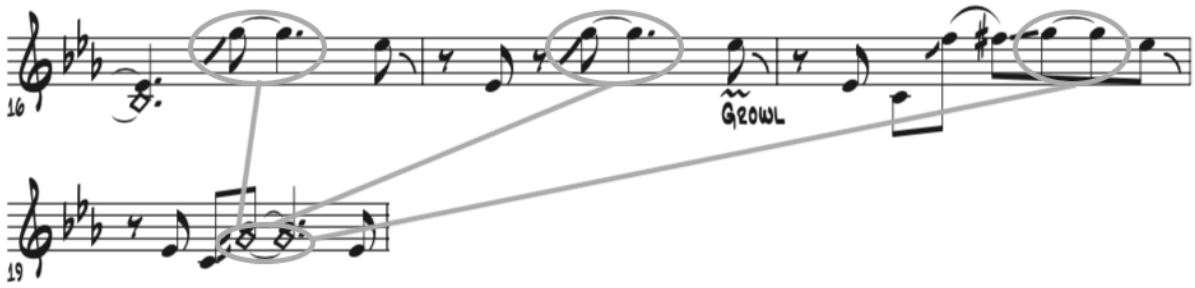
"Up Above My Head"

I simply could not pass up the chance to play this masterpiece. Sister Rosetta Tharpe originally recorded this gospel song in 1947 with her longtime partner Marie Knight. Whether or not Tharpe is playing an acoustic or electric guitar on this recording is difficult to hear, but several of her ideas carried through into her performance on *TV Gospel Time* in the mid-1960s when she was definitely plugged in. My transcription of this latter version attempts to achieve the same rich, gritty sound as Tharpe's Gibson SG by using a distorted sound throughout, and by singing specific pitches while playing to replicate each dyad Tharpe plays. I encourage some experimentation with tongue position to achieve the desired distorted effect throughout the solo.

The challenge here is to learn to sing the (usually lower) notes of each dyad that the clarinet is not playing. The following are cues that I use, though eventually the notes become more automatic with practice. In measure 7, I simply imagine that the final note of m. 6 went down instead of up. In measure 8, the sung G comes directly from the preceding note, so the player must hear it and respond quickly. The following slide is tricky. While relaxing the embouchure to slide down from B♭ to F, the voice must sing a tritone. With some practice, however, the player can begin to predict this interval and the resulting harmony. In measures 9–10, the sung B♭ comes from the note the clarinet has been playing for the past two measures. The A♮ is simply a leading tone to that B♭. The thirds in measures 11–12 are fairly simple to work out. However, the notes in m. 13 are less predictable. I am lucky that the low G3 is one of the lower notes that I can sing while playing, so this made it easier for me. The voice then steps up as the clarinet skips from C4 to E4 to G4. Again, this takes practice to separate what each line is doing. The B♭ in mm. 14 and 15 is like the first B♭ in m. 7, and here the voice takes a leading role in controlling the "I-IV-I" cadential harmony. The G in m. 19 is also easy when one realizes that it is the same gesture already heard three times in mm. 16–18, just an octave lower (see Figure 38). In m. 21, the voice takes the upper note because I hear the

lower note as a continuation of the melody that the clarinet was already playing. If the player can swing their clarinet in a circle or two during the bend in m. 21, all the better.

Figure 38. Cues for M. 19



I found measures 25 to the end to be the most challenging of the whole solo. Again, the harmony in thirds is fairly predictable, but at the speed at which Tharpe plays it, alternating between singing those harmonies and playing the non-sung notes takes practice and time. The E♭s to D♭s in m. 25 cannot really be "bent," so I play them as two separate notes. Keeping the left hand C♯ pinky key down through the whole measure helps slightly. In practicing measure 26, at a certain point I was unable to play the G4 grace notes, so I stuck to just playing the E♭4s. Additionally, on the clarinet a fast scale is easier, and perhaps more accurate to Tharpe's slides, than true bends or glissandos. In mm. 25–26 I play B♭, C, D♭; in mm. 26–27 I play B♭, B♮, C; and in mm. 27–28 I play C, D, E♭. In measure 29 I lip down the first two E♭s, but I do a fast descending scale for the final E♭.

Finally, in measure 31, I use "1+2 over 1+2," sliding the second finger off of the tone hole to achieve the bend to the "1-and-1+2" alternate E♭ fingering, then switching to "side" E♭ for the "normal" E♭ fingering (Figure 39).

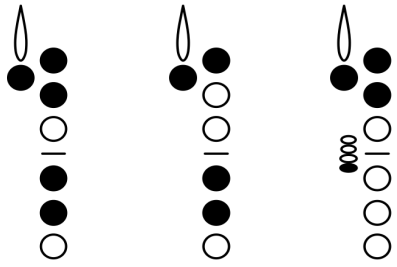


Figure 39. Alternate E♭ Fingerings

"Bulls on Parade"

With this project, I wanted to explore the limits of what kinds of techniques the clarinet could replicate. I may have found it with Tom Morello's "record scratch" solo on Rage Against the Machine's "Bulls on Parade." In the solo, Morello uses his left/fretting hand to scrape along the strings, while flipping the pickup toggle back and forth. He turns the treble up all of the way to accentuate the effect, and the change in tone and pitch is dependent on the placement of that left, "scratching" hand. (Note: I also enjoyed the idea of using extended techniques to replicate a guitar that is using extended techniques to imitate a turntable that is played in a non-traditional way.) In listening to the original studio solo at a slower tempo, I discovered essentially two sounds that I could attempt to imitate.

The first sound is when he moves his hand slowly, usually as he goes down the neck. This produces a portamento, siren-like sound. Slowing this section down significantly to 25-50% tempo, I could make out distinct pitches he was playing. They were high enough that the B-flat soprano clarinet simply would not be able to play them quickly, dependably, and effectively, so I decided to write it out for the E-flat clarinet. Even still, the solo goes to a written B♭6, which is not a common note for the E-flat clarinet to play. Essentially this "slow hand scratch" is played by scooping between the notated pitches. The player will have to experiment with which fingerings produce the best scooping effect. For the most part, I found that "fake" fingerings scooped the best, but by definition they want to drop down to their chalumeau fundamentals. In some cases, I had to use my fingers more than others. For example, the G6s at the end of m. 2 come out well if approached using a finger glissando from E6. Familiarity with the recording is crucial to knowing how to pace the scoops. For example, most of the sixteenth notes that scoop up to a higher note (e.g. m. 1 and 2) are held for a moment before bending, hence the "tenuto" markings. However, for the rapid

sequence of scoops in m. 4, the peak of each scoop—the notated pitches—are only held for a split-second.

The second sound is the "fast scratch," which resembles a fast pick scrape. For this, I use the "kiss" sound described earlier, notated with an asterisk below a rest. Alternating this sound with the scoops approximates this record scratch technique, though it certainly has its limitations. First, since the mouthpiece must be moved in and out of the mouth, the speed is limited. Not only is there a physical limitation, but as the speed increases, the risk of damaging the mouthpiece by hitting it against the teeth increases (or for that matter, damaging the teeth). For me, the faster I go, the more it aggravates an underlying TMJ dysfunction. I am able to play the solo at quarter-note=58, roughly 70% tempo. Even at this tempo, the quick alternations in m. 6 pose a challenge such that I have to alternate the notes with my tongue (rather than my lower lip) pressed against my upper lip to achieve the "kiss" sound. The sacrifice is a reduction in the volume of the "kiss."

A final note: this is the most "academically" accurate transcription I could make. However, the goal is simply to improvise with the "scratch" effect, so even Mr. Morello does not suggest doing it the same way every time.[237]

[237] Tom Morello, "Tom Morello Guitar Lessons 03 Bulls On Parade" (video tutorial), posted November 5, 2009, accessed July 16, 2021, https://youtu.be/kyxKJLgfT7A.

"Eruption"

Speaking of exploring limits, this thesis could potentially have the subtitle "How to Play Eddie Van Halen's 'Eruption' on the Bass Clarinet" simply because it uses nearly every technique mentioned in the chapter on guitar effects. For those reasons, it is both the perfect solo for this project, and also one of the most challenging things I have ever undertaken. I will go through the solo in chronological order. Prior to playing, follow the instructions on page 3 to create the PVC extension that replaces the bell of a low C bass clarinet. Place a plug for the rear street elbow outlet nearby, or sitting crooked in the street elbow outlet, but not covering it.

The first gesture is a power slide down to a power chord. The fingered notes should be played as written, but the sung notes can be approximate, as long as the player ends an octave above the written B♭3. As soon as this octave is reached, use a loose jaw to achieve a spectral multiphonic with only the lowest overtones (reference the written pitches when practicing).

The triplet notes in m. 1 are palm-muted, so they can be slap-tongued on the bass. The following measure starts with a pinch harmonic on the guitar, so an attempt should be made to play a harmonic multiphonic. Measure 3 is simply a repeated riff, followed by two more harmonic multiphonics and another repeated riff in measure 4. The articulations in m. 4 resemble how I hear Van Halen picking, and may need to be double-tongued for speed. Measure 5 has some sort of muting, and can be imitated by touching the reed far from the tip (near the lower lip) so that it can still vibrate.

Measure 6 has the first bar dive. Key bends achieve this. The dive starts on a G♭3, and that key can be slowly raised to reach F3. At that point, however, if the low C (C2) key is depressed slowly, the other keys should not need to be used as intermediaries. While on C2, one pinky should switch to the D2 key. The C key is raised, and as soon as D2 is reached, the grace note breaks the bar dive. From the A♭, slowly raising and lowering the right hand middle finger with a loose jaw

achieves the quasi-vibrato ending in m. 6. At this point, Van Halen continues, but this is the only place where the PVC street elbow can be plugged. It should still be done as quickly as possible to avoid disrupting the flow of the solo.

The following power chords are just like the opening spectral multiphonic. Once the third one is played, the player should focus the voicing on the upper note and use their tongue position to gliss up to a high G. Luckily, this can all be done using the same low E♭ fingering, though adding the register key and venting the left hand first finger will help.

As with the middle section of "Stairway to Heaven," each player will need to experiment with fingering options that work for the following section. On the bass clarinet, I do not believe this section can be played even close to the speed that Van Halen plays it, though I would be excited for someone to prove me wrong. For the initial B♭6s, choose the two most reliable fingerings and alternate between them. For my instrument, they are the fingerings in Figure 40. For the final quintuplet bends in measure 11, I play the preceding B♭ with the side key, then remove my thumb to get the D♭. Shaking the instrument a bit helps get the guitar effect as the thumb depresses and leaves the thumb plate.

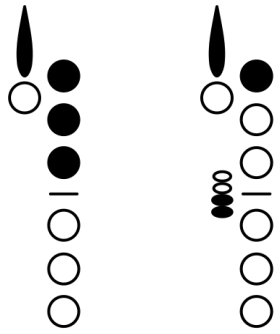


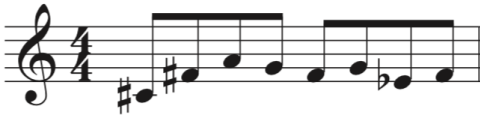
Figure 40. Alternative B♭6 Fingerings

The second bar dive is a quick heterodyne tone. The chances of it occurring perfectly are slim, but an effort should be made to try and make the final F over B♭ a perfect interval. I believe that if the voice is stronger than the bass clarinet, the low tone will be better heard, but if this strong

dynamic is simply done using the air, both notes will either get louder or softer at the same time. If the embouchure pressure is relaxed, then the bass clarinet tone will be quieter and airier, but the voice can project more loudly.

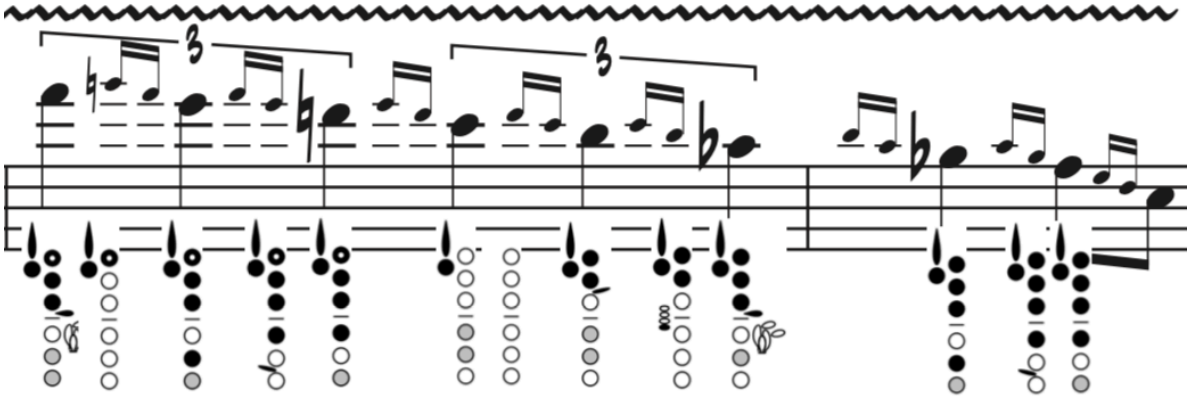
Exhibiting the influence of classical composers, the following several measures directly quote the second etude from Rodolphe Kreutzer's *42 études ou caprices* for violin. Van Halen plays the figure while tremolo picking. Someone who has facility with "on-the-reed" double tonguing may be able to play this in a similar fashion, but timbre-trilling is also an option, especially in this range. After much experimenting, I found that over-blowing the following figure while trilling the right hand second and third fingers gives a good approximation:

Figure 41. Fingerings for Kreutzer Passage



These notes may need to be adjusted slightly for pitch. On my instrument, the E♭ has to be played with both the side and sliver keys. Measures 14 and 15 are not as simple. The notes preceding the C6 can be played with "half-holed" fingerings, similar to those in the altissimo of the soprano clarinet. The E♭ should be played with the right hand middle finger, and the timbre trilled with the ring finger. The grace-note E♭ should be played with the "forked" fingering, and the D also trilled with the right hand ring finger. C6 is trilled with right-hand first and second fingers, followed by "open" D, then the B♭ with the sliver key with the same first-and-second-finger trill. The grace-note B♭ is played with the side key, and the A♭ trilled with only the right hand second finger. In the next measure, use middle-finger G♭ with a third-finger trill, forked G♭ in the grace note, then continue the third-finger trill on F. All of this can be practiced with measured, five-note trills (no trills on the grace notes). See Figure 42 if this explanation is unclear; keys that are black are depressed, keys that are gray are trilled.

Figure 42. Timbre Trills, Eruption mm. 14-15



Side C helps the bend down to throat A. For the E♭4 to D5 at the end of m. 15, it is so fast that the player should just try to get as many notes as they can. The lowest bar dive is in measure 16, and this is where the PVC slide comes into play. Similar to the first bar dive, key-bend from G♭ to F to low D. Key bending from that D to low C will produce a squeak, so at this point the clarinet version has to deviate from the guitar version and simply skip to the low note produced by the slide. One foot (I use the left foot) pushes the slide out and pulls it back in, and again, the fingers must "jump" to low D with one pinky while the other keeps the low F key depressed. At this point, the D must be raised extremely slowly to achieve the end of the dive.

The "Pah!" marking following the dive is Derek Brown's "Pop," played by exhaling a puff of air into the reed while making a "Pah!" syllable with the lips. The mouth leaves the mouthpiece entirely but returns immediately to play the D♭ to F slide. Some experimentation may be necessary to find which location on the reed and which fingering gives the best effect. I find that fingering the following D♭ with slightly more mouthpiece than I am used to works best. Measures 18-22 sound best with "on-the-reed" double tonguing, but "ta-ka" double tonguing can work if played extremely legato.

Measure 22 starts the famous "tapping" section. Once again, playing at a speed even close to Eddie Van Halen's (quarter-note=160) is hard at best, but, as mentioned earlier, even if the fingers can move that fast, the bass clarinet simply does not respond as quickly or as uniformly as the guitar.

I have found that anything above about 116bpm sounds frantic and mushy. In addition, even if the first few measures can be performed faster than that, the player will regret that decision when they get to measures 32 through 35.

I use 1-and-1 B♭ for m. 25 (Figure 43), and 1-and-1+2 B♭ for m. 26(Figure 44). On my instrument, by opening the left-hand G♯ pinky key while fingering E, I get a G♮ (Figure 44). This puts all of the motion for measure 24 in the left hand (the right hand first and second fingers stay down). The final C major arpeggios can be played with normal fingerings. Measures 28 and 29 are also normal, but with open fingerings for D♭, E♭, and F. I use "overblown throat B♭" for the first seven Fs of m. 30, but I switch to throat A plus side key 3 for the last F, and all Fs in mm. 31 and 32 (Figure 45). Measures 32–35 use normal (with "fake" altissimo) fingerings. At some point, I go from hearing the high note as the downbeat to hearing the low note as the downbeat. This is confirmed when Van Halen lands on the "low note" of the figure in measure 41. However, I cannot tell exactly when this switch takes place. It may be somewhere around m. 30, but I threw a septuplet into measure 38 to make sure that the player feels it that way by the end.

Figure 43. Eruption m. 25 B♭ Fingering

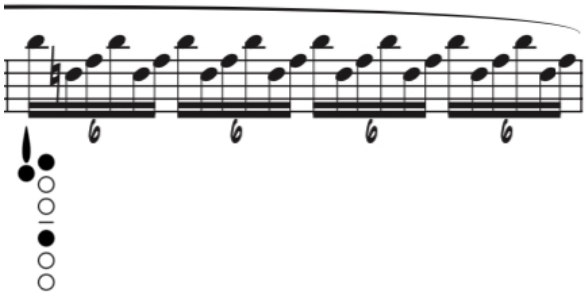


Figure 44. Eruption m. 26 Fingerings

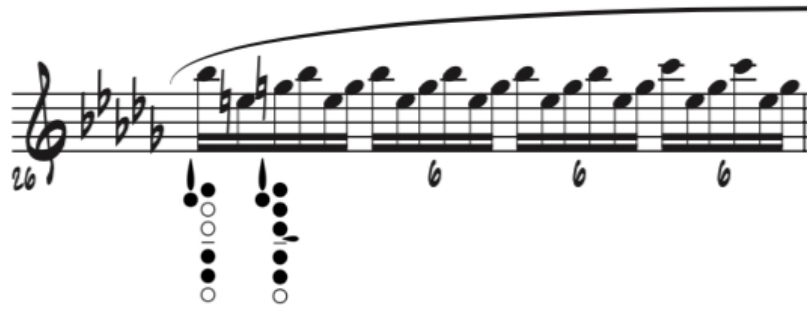
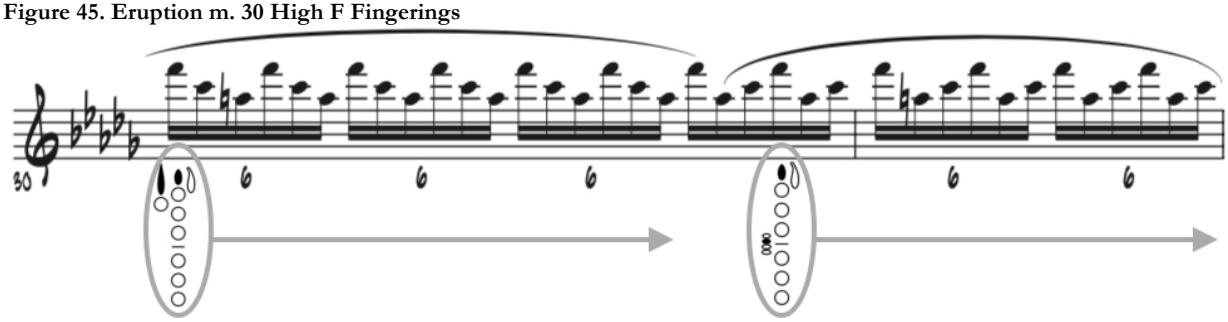


Figure 45. Eruption m. 30 High F Fingerings



Again, for the slides in m. 41, just get as many notes as possible. Notice in the original recording that the low F3 and the following F4 are not a perfect octave. The F4 sounds slightly low to my ears, so I play it using the thumb and middle finger of the left hand (Figure 46). Depending on how out of breath the player is, they may need to circular-breathe during this F4, or even during the final note. For the final bar dive, loosen the jaw as much as possible without leaving the mouthpiece entirely, blow like crazy, and finger a slow-motion descending scale. It does not have to be chromatic, but playing the final G♭ to F helps. Repeat the dampening effect of placing the tongue low on the reed during the final note, and change the shape of the oral cavity to get different sounds and overtones, simulating the phase shifting and Univox EC-80 in Van Halen's recording. Fade to *niente*, and take a bow.

Figure 46. F-quarter-flat4

Conclusion

I had two questions when starting this project: "Is it possible?" and "Is it worthwhile?" Through researching and listening to other artists who have attempted the same thing, and interviewing people with open minds to the possibilities of this type of music, I think the answer to the latter question is a resounding "yes." By choosing challenging solos and working out all of the techniques that they employ, the answer to the first question is also, with some caveats, "yes." Certainly at a slower pace and with practice it is possible. Eventually, perhaps an entire etude book could be created from these solos, not necessarily to be played with a rock band, but as a way to explore sounds and techniques and genres that are new and fresh to a classical musician, or that are old and familiar to a new classical audience. Scott McAllister recalls after performances of his rock-inspired music, "I had people from 90-year-old men and women coming up to me saying how inspirational and credible the piece was, to young kids, to people my parents' age who grew up with this music."[238]

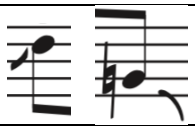
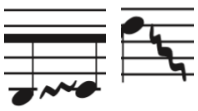
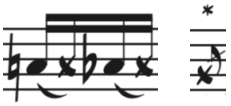
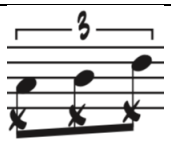
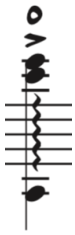
Apocalyptica's live performance of "One" has 22 million views on YouTube, the Harp Twins' cover of the same song has 14.5 million views, and a play-along of DragonForce's "Through the Fire and Flames" on recorder has 6.7 million views. As mentioned earlier, Gleb Kanasevich's video of "Spheres of Madness" got 300,000 views in three days. There is a draw for people to see an acoustic instrument making sounds like an electric guitar; it fascinates us. This presents one other avenue for showcasing these transcriptions: the internet and social media. Play-along "covers" are so common among rock and jazz musicians that they could constitute a new genre in and of themselves. Are they acceptable "performances"? The above figures indicate that, at the very least, an audience and demand exist for this mode of performance. My hope is that clarinetists take the

[238] Money, "The Clarinet as Guitar Hero," 77.

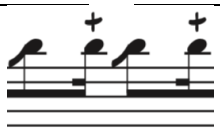
ideas from this project and run with them. Perhaps the next musician to play as a guest with Metallica will be a clarinetist. For now, I am going back to *Guitar Hero III* to see if I can beat the final boss by playing "The Devil Went Down to Georgia" on the clarinet.

Appendix A: Complete Solo Transcriptions[239]

A note about notation: I tried to be as accurate as possible with articulations. Unlike some jazz lead sheets and transcriptions, if there are no slurs, do not assume the articulation is up to the performer. No slur indicates that the notes must all be articulated.

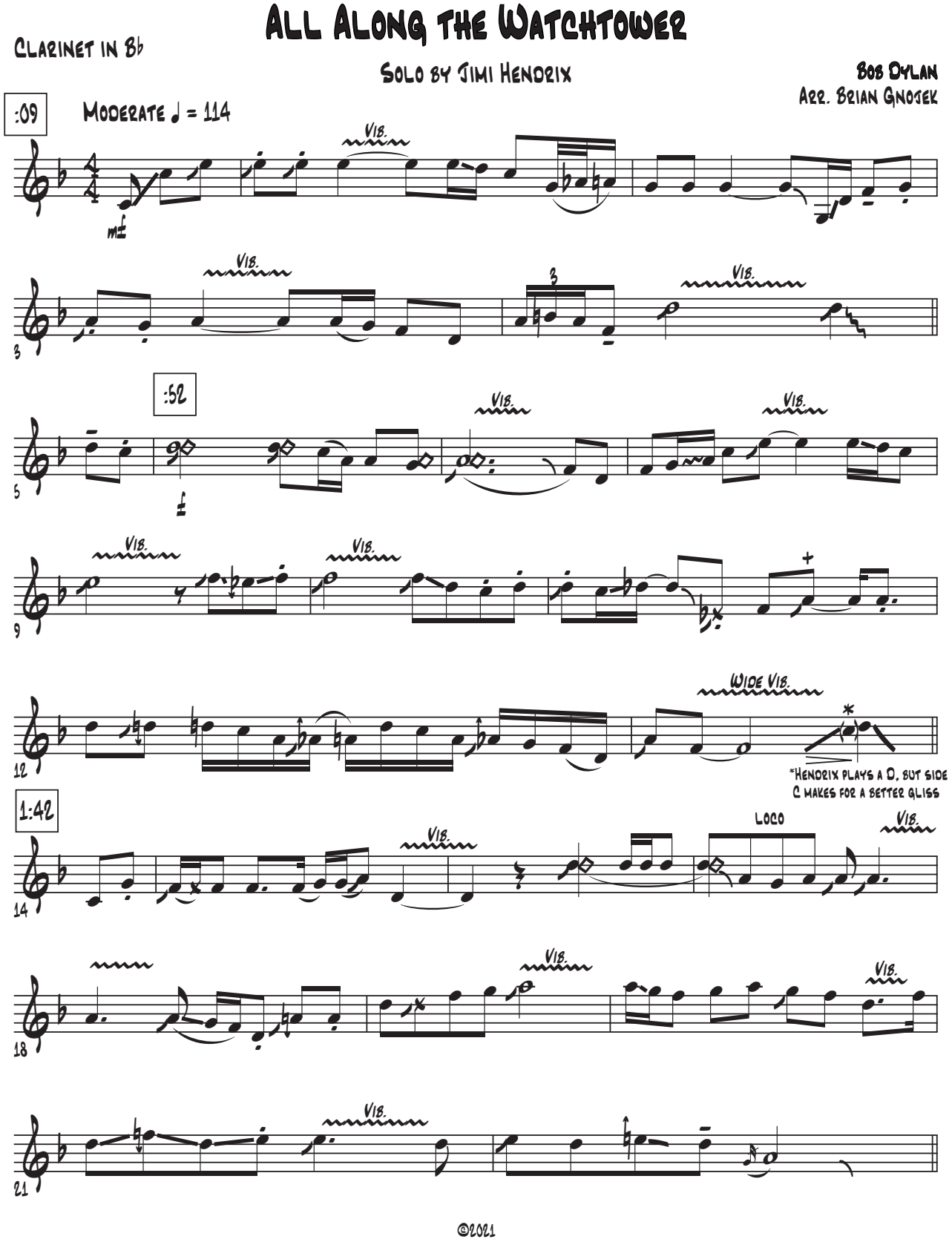
Bends are indicated with curved lines preceding or coming after a note. • Unless otherwise notated with an articulation marking, assume any bend or slide is slurred.	
Glissandos are indicated with a thick line connecting two notes.	
A wavy line between notes indicates a slide: a chromatic scale should be played between the notes. A wavy line after a note indicates to play a quick desending chromatic scale.	
"Growl" indicates to sing any pitch into the instrument while playing the indicated notes.	
Notes with diamond heads should be sung at the exact *written* pitch of that note (it will sound a major second lower for soprano clarinet, a major ninth lower for bass clarinet).	
Notes with an "x" in place of a note head are played with the tongue touching low on the reed, unless there is an asterisk (*) over it, which indicates Derek Brown's "pop" sound.	
A rest with an asterisk under it indicates to perform a "kiss" sound at the tip of the mouthpiece.	
A note with an "x" through the stem indicates a slap-tongue.	
A wavy line going straight up with additional pitches and a small circle (°) above them all indicate a spectral multiphonic, preferably with the notated harmonics.	

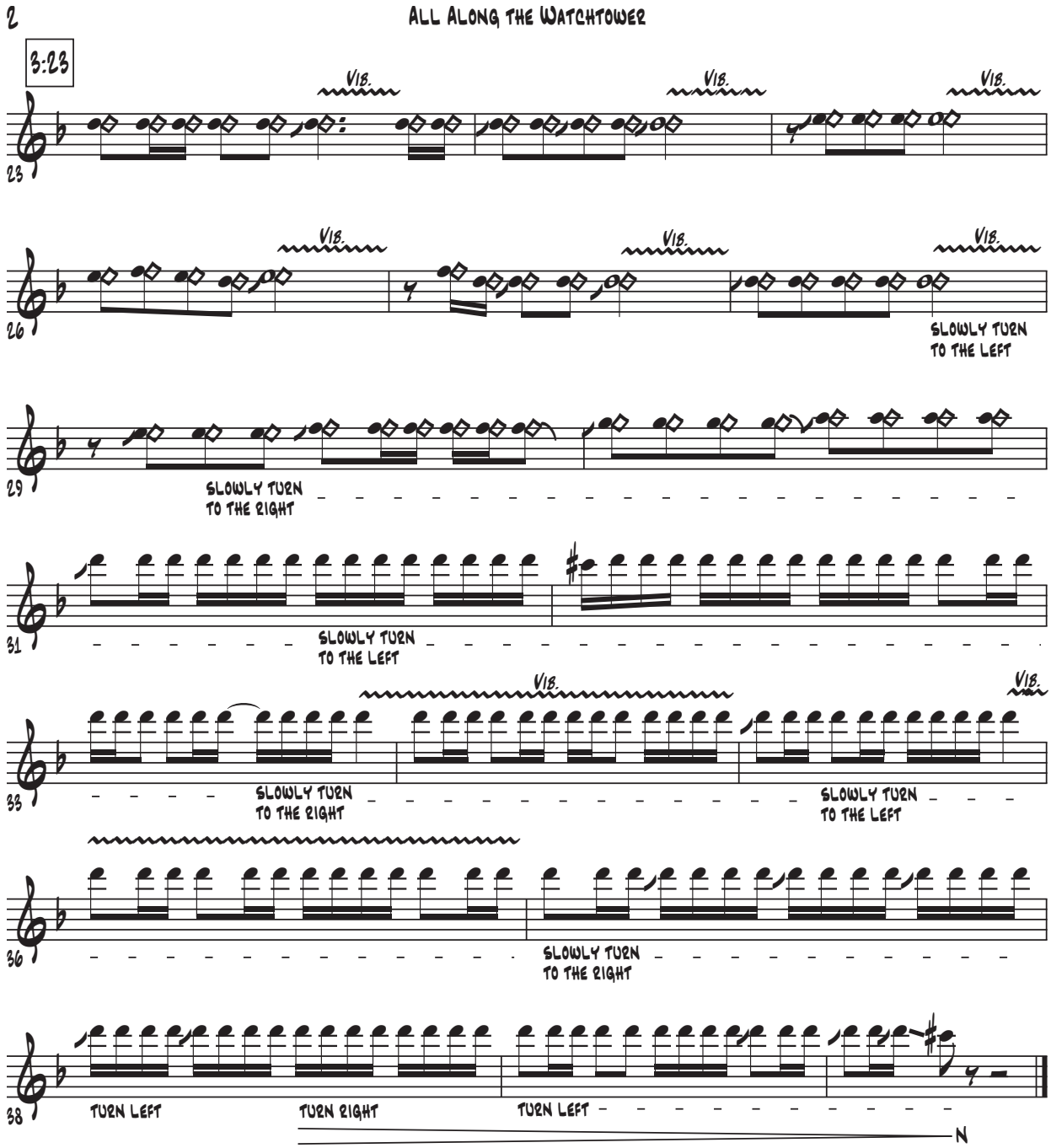
[239] Recordings of these solos are available at clarinethero.com.

Small notes above a larger note indicate to bite or overblow to achieve what I call a "harmonic multiphonic."	
A "+" above a note indicates to use an alternate fingering.	
An "s" over a note means to play it with a side/trill key.	
An "n" over the note means to play it with a "normal" fingering, like one that could be found on a basic fingering chart for B-flat clarinet.	

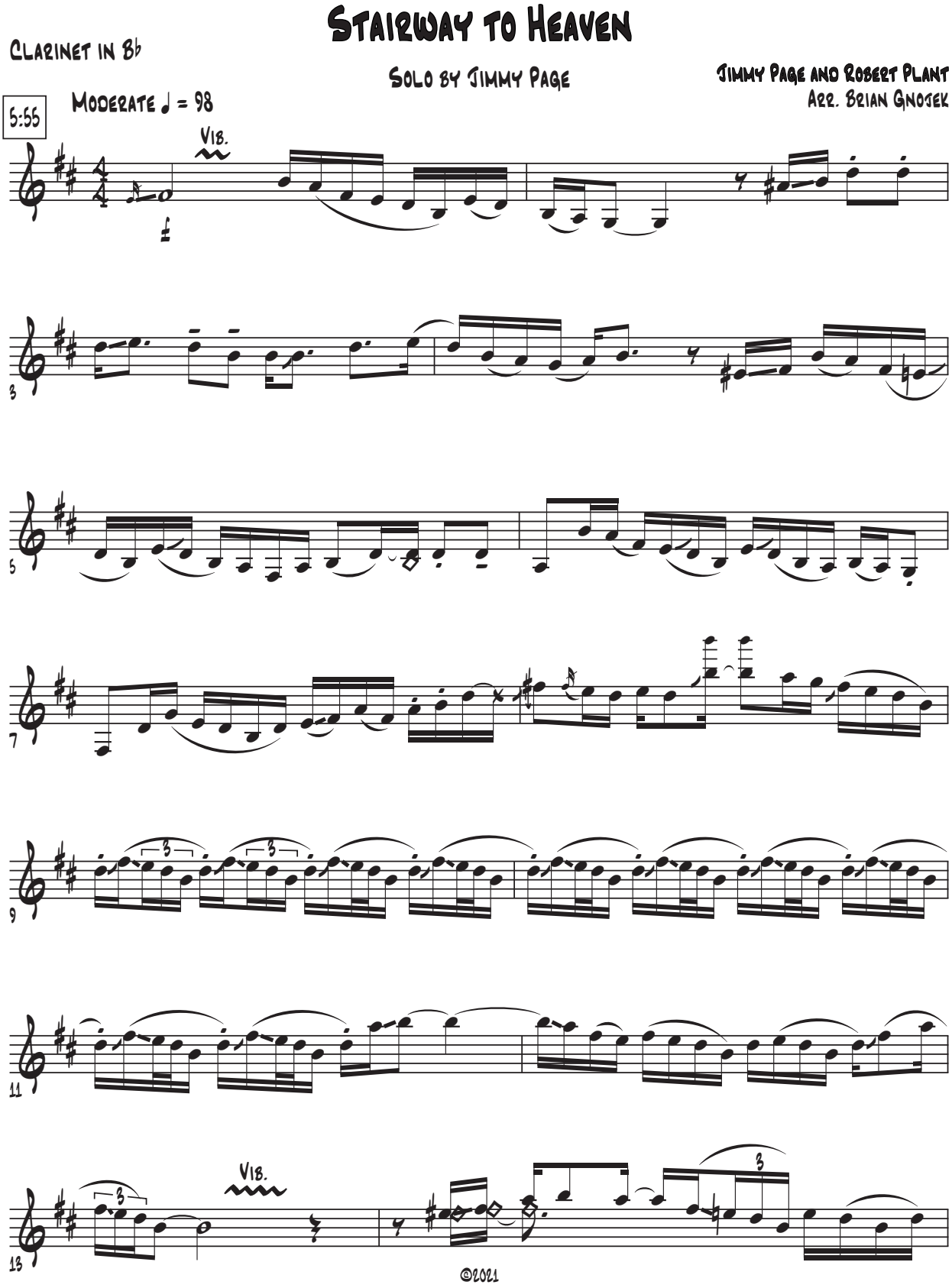
Any arrows attached to accidentals indicate quarter tones. For example, B𝄳 indicates the note should be played a quarter-step higher than B♭. C𝄲 indicates that the note should be a quarter-step flat from C♮.

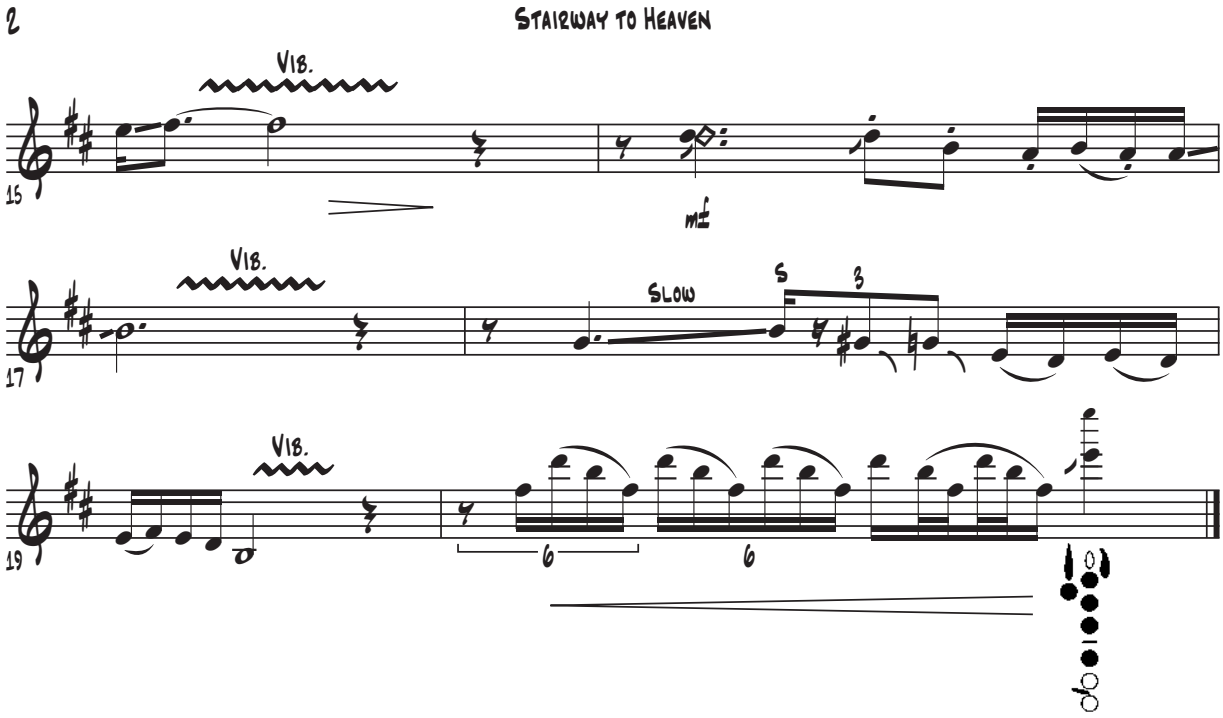
"All Along the Watchtower"



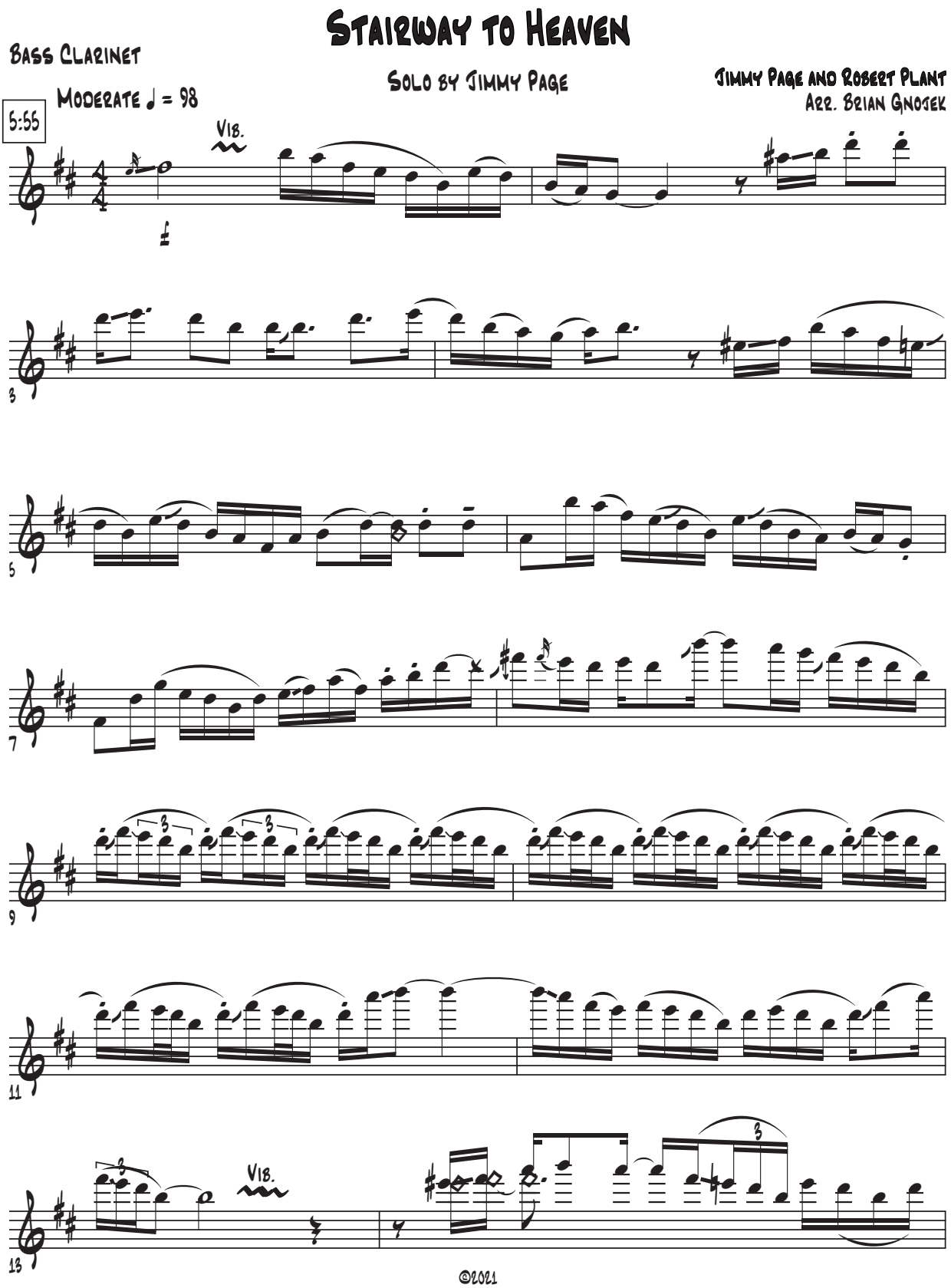

2
All Along the Watchtower
3:23
Vib.
Vib.
Vib.
23
Vib.
Vib.
Vib.
26
Slowly turn
to the left
29
Slowly turn
to the right
31
Slowly turn
to the left
Vib.
Vib.
33
Slowly turn
to the right
Slowly turn
to the left
36
Slowly turn
to the right
38
Turn left
Turn right
Turn left
N

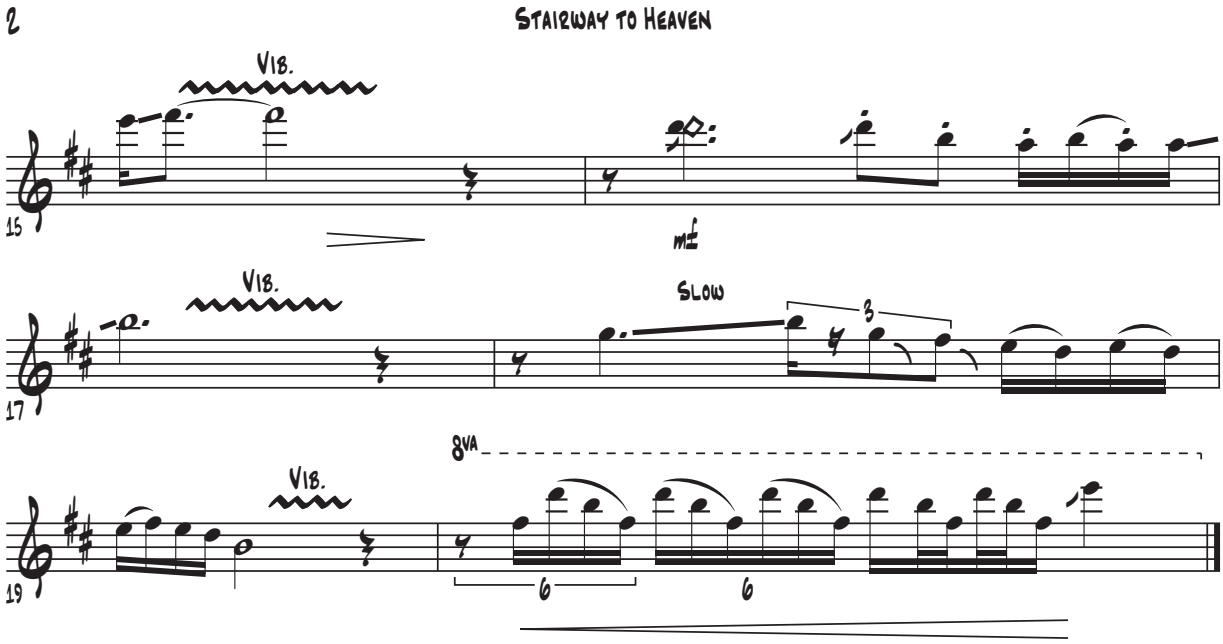
"Stairway to Heaven": B-flat Clarinet



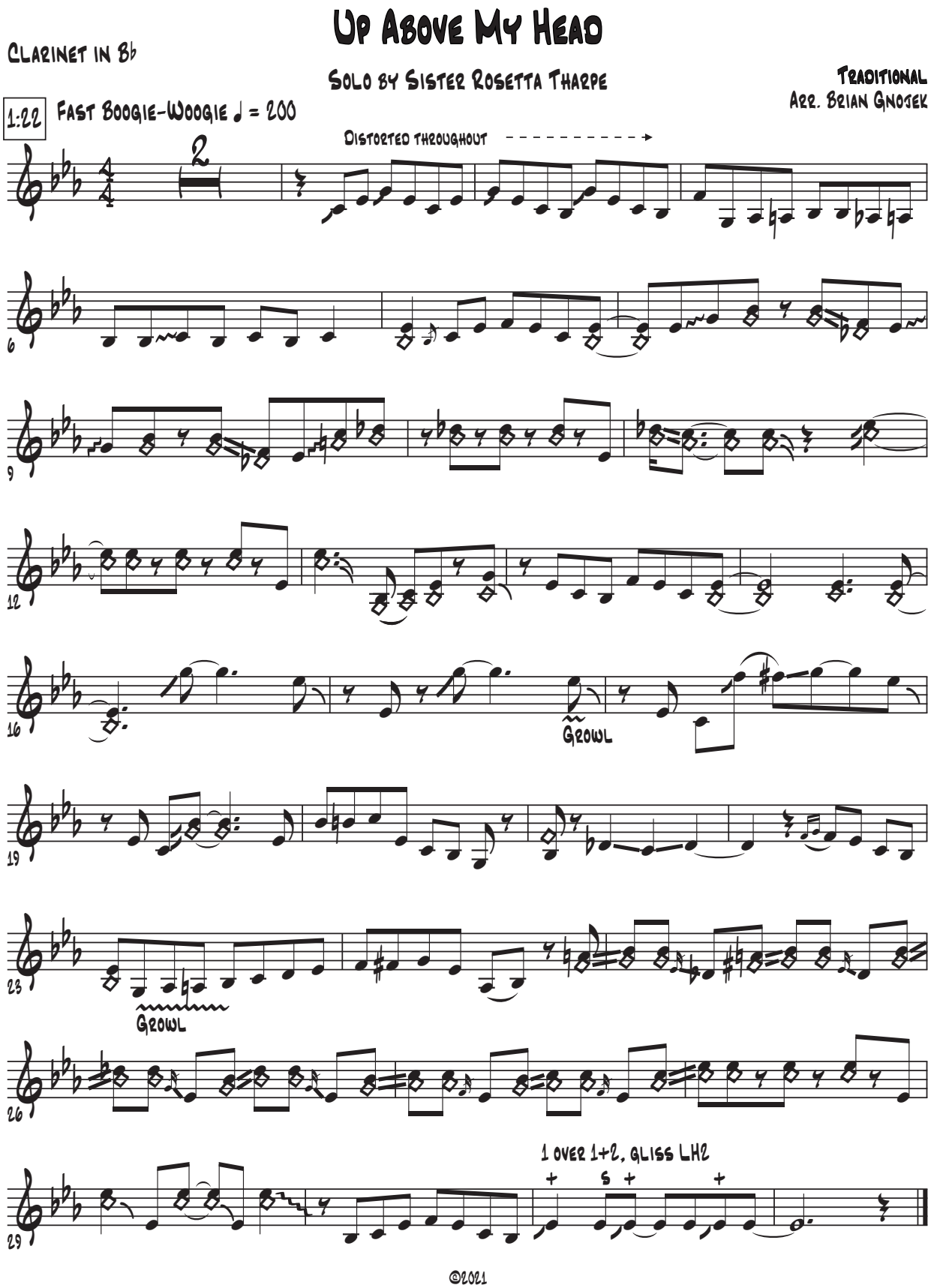

2
Stairway to Heaven
Vib.
15
mf
Vib.
17
Slow
Vib.
19
6
6

"Stairway to Heaven": Bass Clarinet

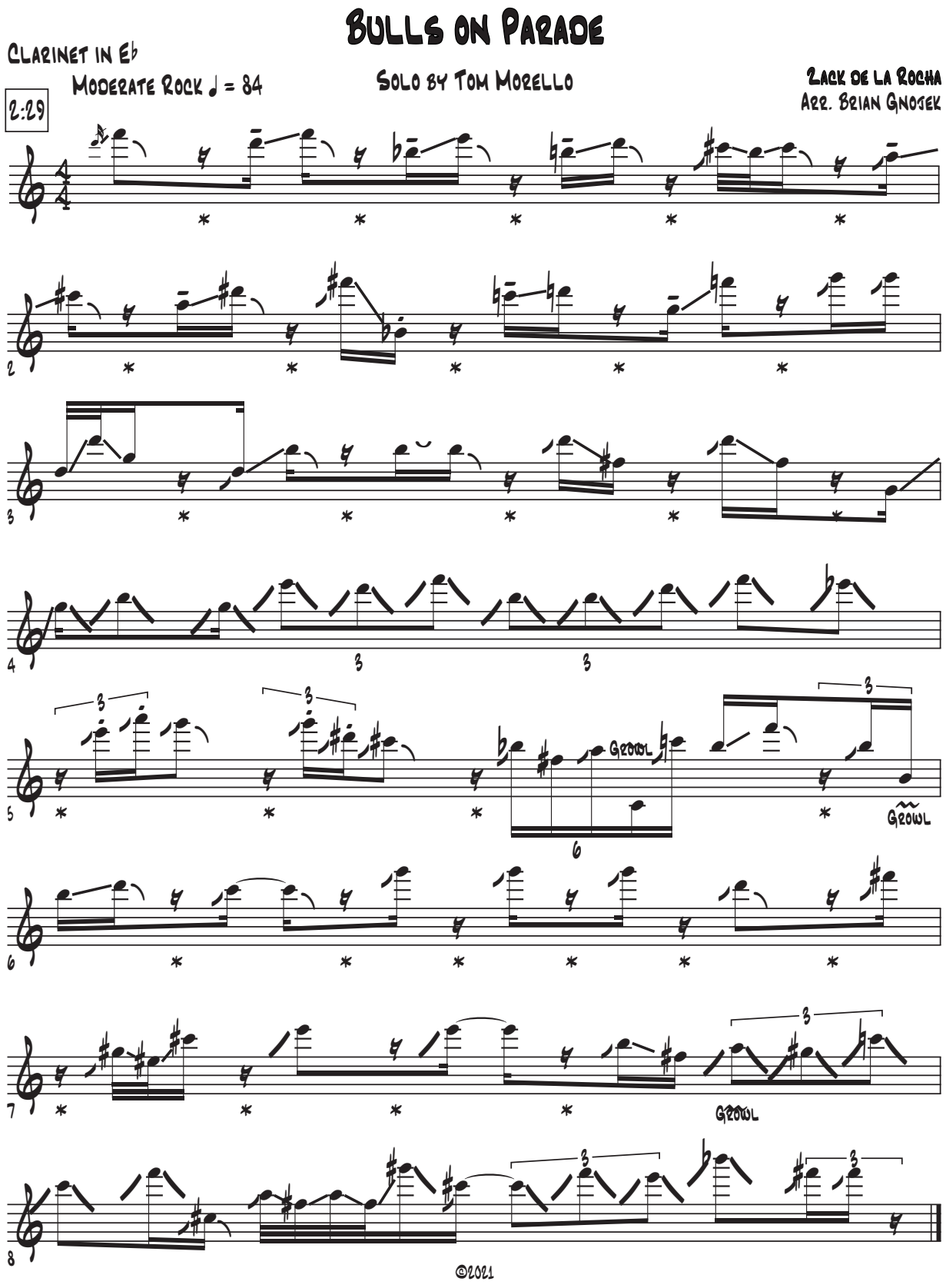



2
Stairway to Heaven
Vib.
15
mf
Vib.
Slow
3
17
8va
Vib.
19
6
6

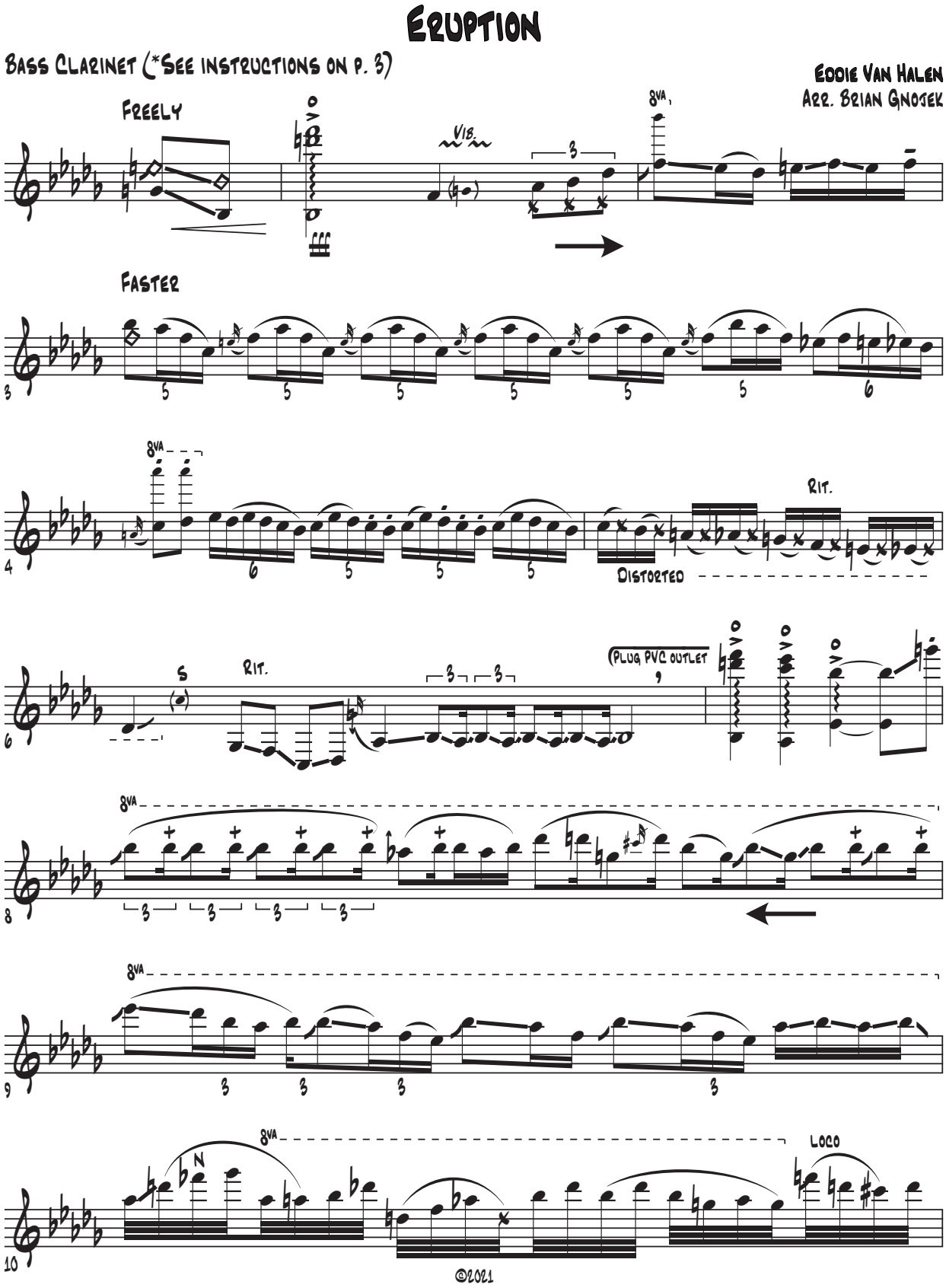
"Up Above My Head"

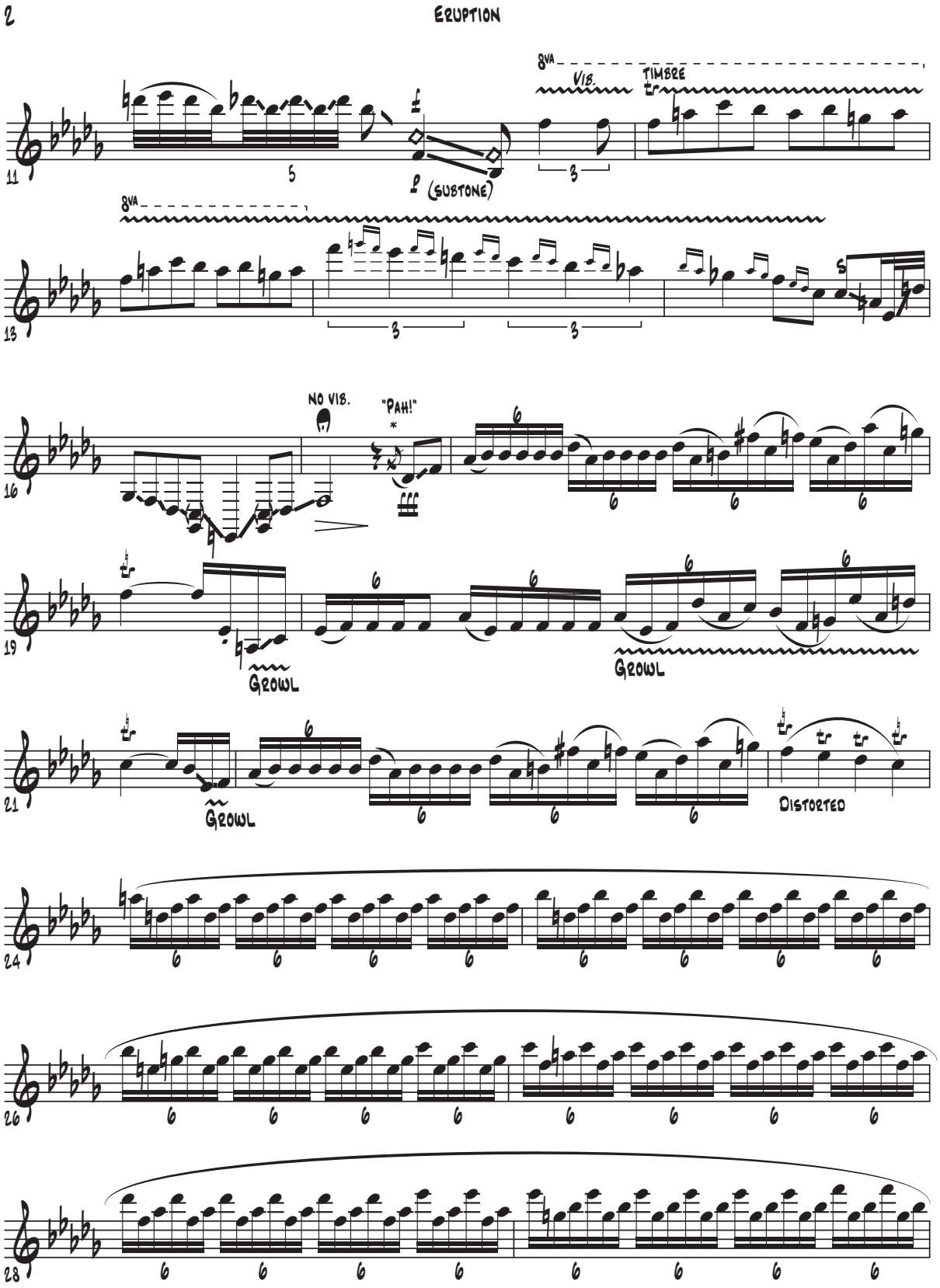


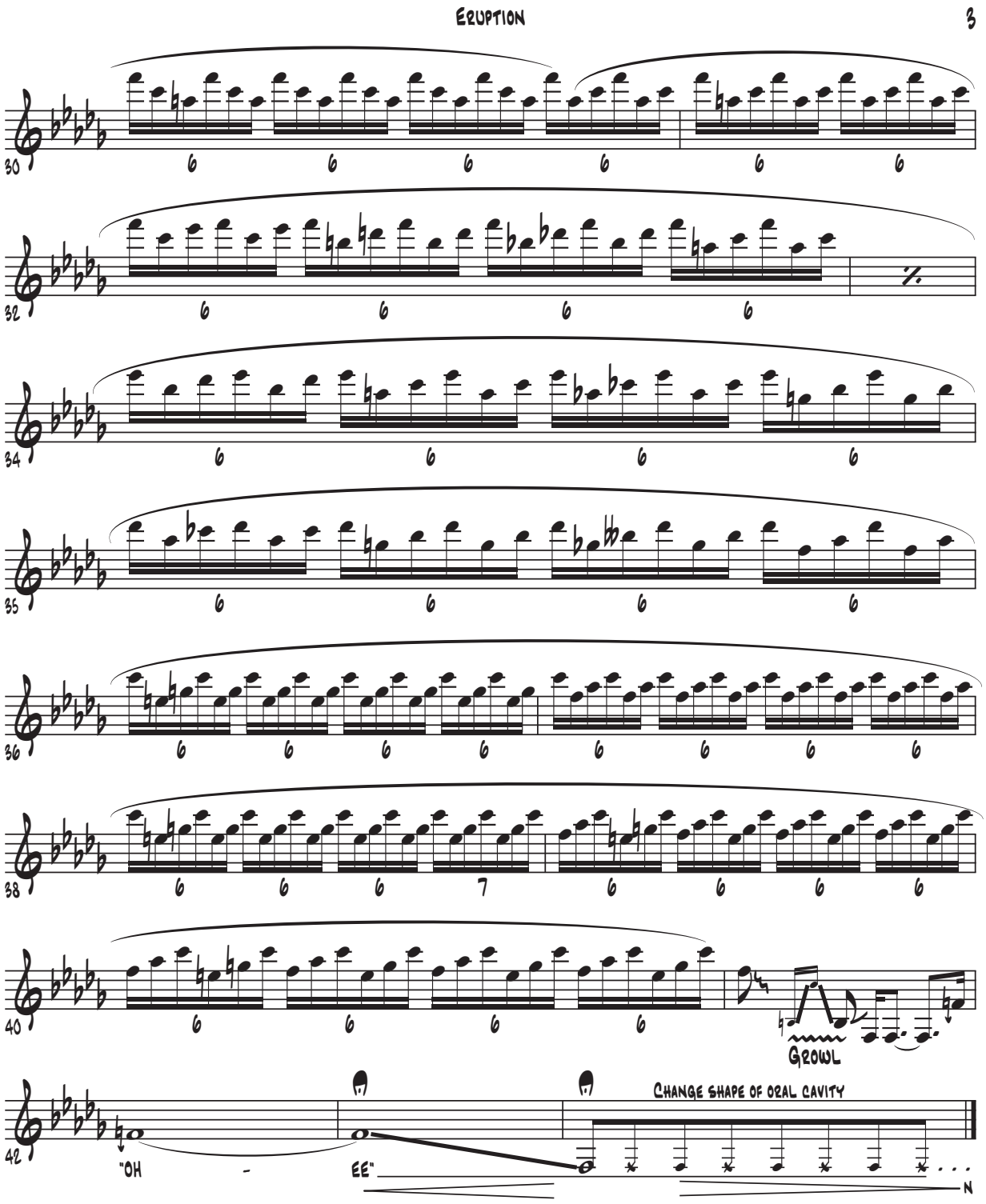
“Bulls on Parade”



"Eruption"


Eruption
Bass Clarinet (*See instructions on p. 3)
Eddie Van Halen
Arr. Brian Gnosek
Freely
8va
Vib.
Faster
Rit.
Distorted
(Plug PVC outlet)
Rit.
8va
8va
8va
8va
Loco
©2021


2
ERUPTION
8va
Vib.
TIMBRE
(SUBTONE)
8va
NO VIB.
"PAH!"
GROWL
GROWL
GROWL
DISTORTED



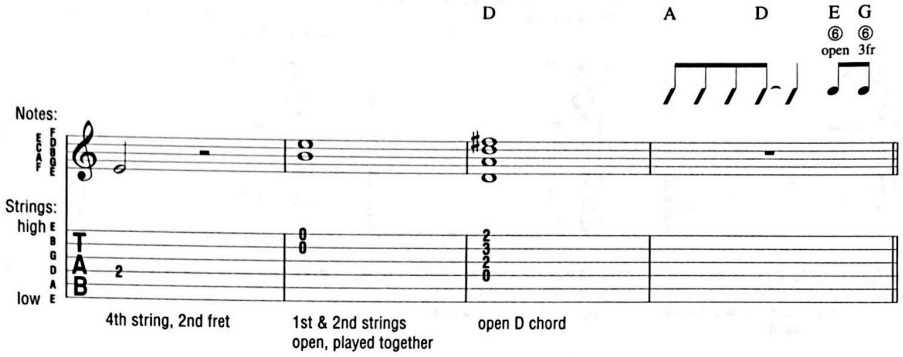
*REPLACE BELL WITH A 1" PVC SxSxS TEE COUPLING ATTACHED TO A 2' LENGTH OF 1" PVC PIPE. PUT A 2' SLEEVE OF 1 1/4" PVC OVER THE 1" PIPE. ATTACH A 1" STREET ELBOW TO THE REAR SOCKET OF THE T COUPLING. HAVE A CORK OR STOPPER OF SOME KIND AVAILABLE TO PLUG THE OUTLET OF THE STREET ELBOW.

Appendix B: Guitar Technique/Notation Legend[240]

RHYTHM SLASHES are written above the staff. Strum chords in the rhythm indicated. Use the chord diagrams found at the top of the first page of the transcription for the appropriate chord voicings. Round noteheads indicate single notes.

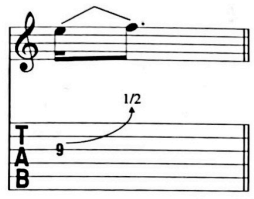
THE MUSICAL STAFF shows pitches and rhythms and is divided by bar lines into measures. Pitches are named after the first seven letters of the alphabet.

TABLATURE graphically represents the guitar fingerboard. Each horizontal line represents a string, and each number represents a fret.

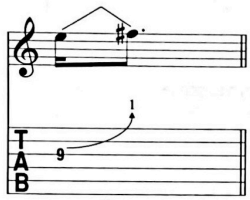


Definitions for Special Guitar Notation

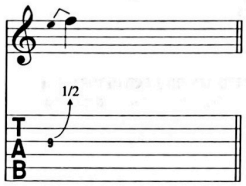
HALF-STEP BEND: Strike the note and bend up 1/2 step.



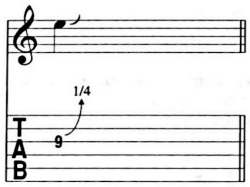
WHOLE-STEP BEND: Strike the note and bend up one step.



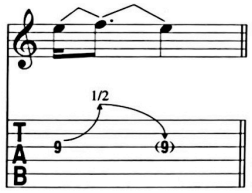
GRACE NOTE BEND: Strike the note and immediately bend up as indicated.



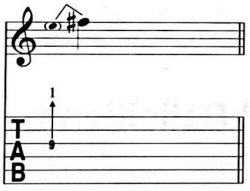
SLIGHT (MICROTONE) BEND: Strike the note and bend up 1/4 step.



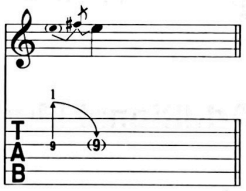
BEND AND RELEASE: Strike the note and bend up as indicated, then release back to the original note. Only the first note is struck.



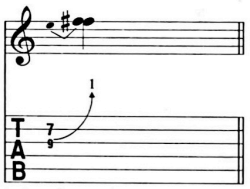
PRE-BEND: Bend the note as indicated, then strike it.



PRE-BEND AND RELEASE: Bend the note as indicated. Strike it and release the bend back to the original note.



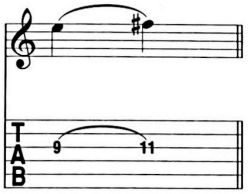
UNISON BEND: Strike the two notes simultaneously and bend the lower note up to the pitch of the higher.



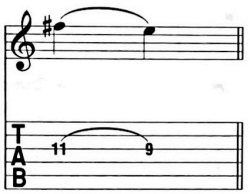
VIBRATO: The string is vibrated by rapidly bending and releasing the note with the fretting hand.

WIDE VIBRATO: The pitch is varied to a greater degree by vibrating with the fretting hand.

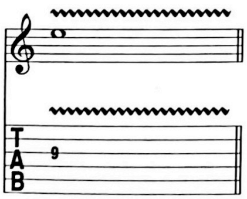
HAMMER-ON: Strike the first (lower) note with one finger, then sound the higher note (on the same string) with another finger by fretting it without picking.



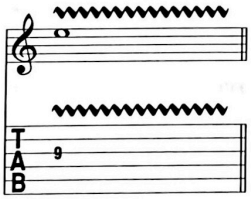
PULL-OFF: Place both fingers on the notes to be sounded. Strike the first note and without picking, pull the finger off to sound the second (lower) note.



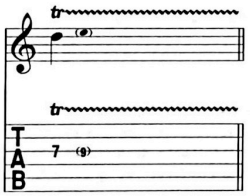
LEGATO SLIDE: Strike the first note and then slide the same fret-hand finger up or down to the second note. The second note is not struck.



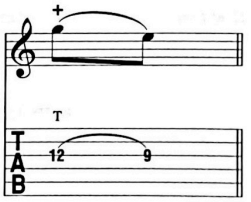
SHIFT SLIDE: Same as legato slide, except the second note is struck.

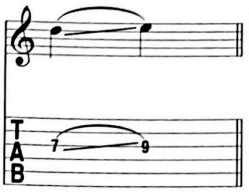


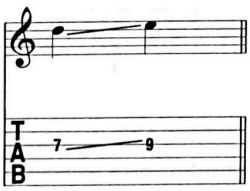
TRILL: Very rapidly alternate between the notes indicated by continuously hammering on and pulling off.



TAPPING: Hammer ("tap") the fret indicated with the pick-hand index or middle finger and pull off to the note fretted by the fret hand.

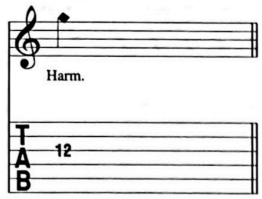




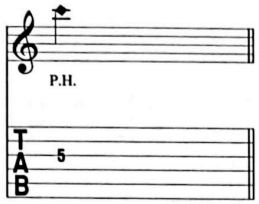


[240] Guitar World, *100 Greatest*, 319-210.

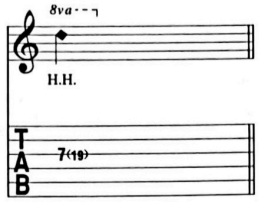
NATURAL HARMONIC: Strike the note while the fret-hand lightly touches the string directly over the fret indicated.



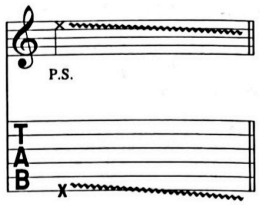
PINCH HARMONIC: The note is fretted normally and a harmonic is produced by adding the edge of the thumb or the tip of the index finger of the pick hand to the normal pick attack.



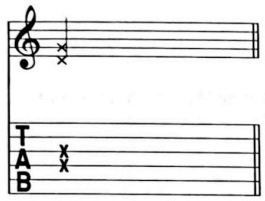
HARP HARMONIC: The note is fretted normally and a harmonic is produced by gently resting the pick hand's index finger directly above the indicated fret (in parentheses) while the pick hand's thumb or pick assists by plucking the appropriate string.



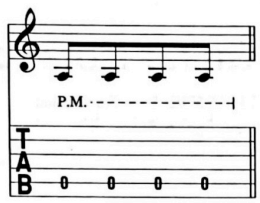
PICK SCRAPE: The edge of the pick is rubbed down (or up) the string, producing a scratchy sound.



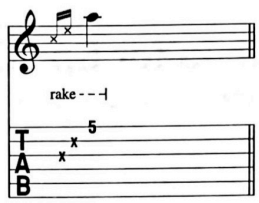
MUFFLED STRINGS: A percussive sound is produced by laying the fret hand across the string(s) without depressing, and striking them with the pick hand.



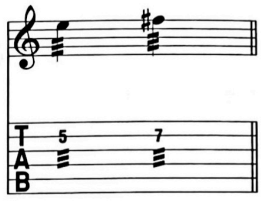
PALM MUTING: The note is partially muted by the pick hand lightly touching the string(s) just before the bridge.



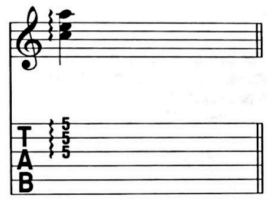
RAKE: Drag the pick across the strings indicated with a single motion.



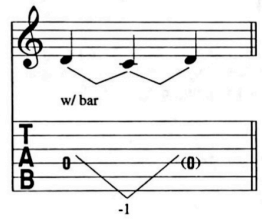
TREMOLO PICKING: The note is picked as rapidly and continuously as possible.



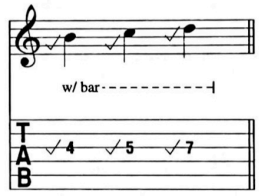
ARPEGGIATE: Play the notes of the chord indicated by quickly rolling them from bottom to top.



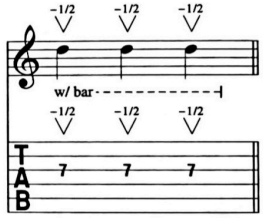
VIBRATO BAR DIVE AND RETURN: The pitch of the note or chord is dropped a specified number of steps (in rhythm), then returned to the original pitch.



VIBRATO BAR SCOOP: Depress the bar just before striking the note, then quickly release the bar.



VIBRATO BAR DIP: Strike the note and then immediately drop a specified number of steps, then release back to the original pitch.



Additional Musical Definitions

(accent) • Accentuate note (play it louder).

(accent) • Accentuate note with great intensity.

(staccato) • Play the note short.

⊓ • Downstroke

∨ • Upstroke

D.S. al Coda • Go back to the sign (𝄋), then play until the measure marked "***To Coda***," then skip to the section labelled "**Coda**."

D.C. al Fine • Go back to the beginning of the song and play until the measure marked "***Fine***" (end).

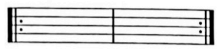
Rhy. Fig. • Label used to recall a recurring accompaniment pattern (usually chordal).

Riff • Label used to recall composed, melodic lines (usually single notes) which recur.

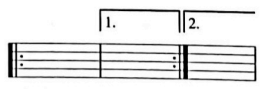
Fill • Label used to identify a brief melodic figure which is to be inserted into the arrangement.

Rhy. Fill • A chordal version of a Fill.

tacet • Instrument is silent (drops out).



• Repeat measures between signs.



• When a repeated section has different endings, play the first ending only the first time and the second ending only the second time.

NOTE: Tablature numbers in parentheses mean:

1. The note is being sustained over a system (note in standard notation is tied), or
2. The note is sustained, but a new articulation (such as a hammer-on, pull-off, slide or vibrato) begins, or
3. The note is a barely audible "ghost" note (note in standard notation is also in parentheses).

Appendix C: Guitar World Magazine's Original (1998) List of "The 100 Greatest Guitar Solos of All Time"[241]

Song Title		Artist/Band
1.	"Stairway to Heaven"	Led Zeppelin
2.	"Eruption"	Van Halen
3.	"Free Bird"	Lynyrd Skynyrd
4.	"Comfortably Numb"	Pink Floyd
5.	All Along The Watchtower	The Jimi Hendrix Experience
6.	November Rain	Guns N' Roses
7.	One	Metallica
8.	Hotel California	Eagles
9.	Crazy Train	Ozzy Osbourne
10.	Crossroads	Cream
11.	Voodoo Child (Slight Return)	Jimi Hendrix Experience
12.	Johnny B. Goode	Chuck Berry
13.	Texas Flood	Stevie Ray Vaughan and Double Trouble
14.	Layla	Derek and the Dominoes
15.	Floods	Pantera
16.	Heartbreaker	Led Zeppelin
17.	Cliffs of Dover	Eric Johnson
18.	Little Wing	Jimi Hendrix Experience
19.	Highway Star	Deep Purple
20.	Bohemian Rhapsody	Queen
21.	Time	Pink Floyd
22.	Sultans of Swing	Dire Straits
23.	Bulls on Parade	Rage Against The Machine
24.	Fade To Black	Metallica
25.	Aqualung	Jethro Tull
26.	Smells Like Teen Spirit	Nirvana
27.	Pride and Joy	Stevie Ray Vaughan and Double Trouble
28.	Mr. Crowley	Ozzy Osbourne
29.	For The Love Of God	Steve Vai
30.	Surfing With The Alien	Joe Satriani
31.	Stranglehold	Ted Nugent
32.	Machine Gun	Jimi Hendrix/Band of Gypsies
33.	The Thrill is Gone	B.B. King
34.	Paranoid Android	Radiohead
35.	Cemetery Gates	Pantera
36.	Black Star	Yngwie Malmsteen
37.	Sweet Child O' Mine	Guns N' Roses
38.	Whole Lotta Love	Led Zeppelin
39.	Cortez the Killer	Neil Young
40.	Reelin' In The Years	Steely Dan
41.	Brighton Rock	Queen
42.	While My Guitar Gently Weeps	The Beatles
43.	Sharp Dressed Man	ZZ Top
44.	Alive	Pearl Jam
45.	Light My Fire	The Doors
46.	Hot For Teacher	Van Halen
47.	Jessica	The Allman Brothers Band

[241] Nick Bowcott, Alan di Perna, Jeff Kitts, Alan Paul, Brad Tolinski, and Harold Steinblatt, "100 Greatest Solos of All Time," *Guitar World,* September, 1998.

Song Title		Artist/Band
48.	Sympathy for the Devil	The Rolling Stones
49.	Europa	Santana
50.	Shock Me	KISS
51.	Master of Puppets	Metallica
52.	Star	Spangled Banner
53.	Since I've Been Loving You	Led Zeppelin
54.	Geek USA	Smashing Pumpkins
55.	Satch Boogie	Joe Satriani
56.	War Pigs	Black Sabbath
57.	Walk	Pantera
58.	Cocaine	Eric Clapton
59.	You Really Got Me	The Kinks
60.	Zoot Allures	Frank Zappa
61.	No More Tears	Ozzy Osbourne
62.	Money	Pink Floyd
63.	Black Hole Sun	Soundgarden
64.	Little Red Corvette	Prince
65.	In Bloom	Nirvana
66.	Blue Sky	The Allman Brothers Band
67.	Beat It	Michael Jackson
68.	Starship Trooper	Yes
69.	And Your Bird Can Sing	The Beatles
70.	Purple Haze	The Jimi Hendrix Experience
71.	Maggot Brain	Funkadelic
72.	Walk This Way	Aerosmith
73.	Stash	Phish
74.	Lazy	Deep Purple
75.	Won't Get Fooled Again	The Who
76.	Cinnamon Girl	Neil Young
77.	Man In The Box	Alice in Chains
78.	Truckin'	The Grateful Dead
79.	Mean Street	Van Halen
80.	You Shook Me All Night Long	AC/DC
81.	Sweet Jane	The Velvet Underground
82.	21st Century Schizoid Man	King Crimson
83.	Scuttle Buttin'	Stevie Ray Vaughan and Double Trouble
84.	Santeria	Sublime
85.	Moonage Daydream	David Bowie
86.	Whipping Post	The Allman Brothers Band
87.	Cult of Personality	Living Colour
88.	Kid Charlemagne	Steely Dan
89.	Killing In The Name	Rage Against The Machine
90.	Let It Rain	Eric Clapton
91.	I Heard It Through The Grapevine	Creedence Clearwater Revival
92.	Stray Cat Strut	The Stray Cats
93.	The End	The Doors
94.	Working Man	Rush
95.	Yellow Ledbetter	Pearl Jam
96.	Honky Tonk Women	The Rolling Stones
97.	Cherub Rock	Smashing Pumpkins
98.	Under A Glass Moon	Dream Theater
99.	Cause We've Ended As Lovers	Jeff Beck
100.	Three Days	Jane's Addiction

Appendix D: Guitar World Magazine's 2021 List of "The 50 Greatest Guitar Solos of All Time"[242]

Song Title	Artist/Band	Former (1998) Ranking, if applicable
1. Bohemian Rhapsody	Queen	20
2. "Eruption"	Van Halen	2
3. Comfortably Numb	Pink Floyd	4
4. Stairway to Heaven	Led Zeppelin	1
5. Hotel California	Eagles	8
6. Sweet Child O'Mine	Guns N' Roses	37
7. Sultans of Swing	Dire Straits	22
8. Free Bird	Lynyrd Skynyrd	3
9. Beat It	Michael Jackson	67
10. Crazy Train	Ozzy Osbourne	9
11. All Along the Watchtower	The Jimi Hendrix Experience	5
12. Purple Rain	Prince	
13. Highway Star	Deep Purple	15
14. While My Guitar Gently Weeps	The Beatles	42
15. Fade to Black	Metallica	24
16. Back in Black	AC/DC	
17. Still Got the Blues	Gary Moore	
18. For the Love of God	Steve Vai	29
19. Reapers	Muse	
20. Cliffs of Dover	Eric Johnson	17
21. Hanger 18	Megadeath	
22. Layla	Derek & The Dominos	14
23. Johnny B. Goode	Chuck Berry	12
24. Blackbird	Alter Bridge	
25. Something	The Beatles	
26. Limelight	Rush	
27. Europa	Santana	49
28. Firth of Fifth	Genesis	
29. Alive	Pearl Jam	44
30. La Grange	ZZ Top	
31. Under a Glass Moon	Dream Theater	98
32. Floods	Pantera	19
33. Crossroads	Cream	10
34. Walk This Way	Aerosmith	72
35. Lenny	Stevie Ray Vaughan and Double Trouble	
36. Cause We've Ended as Lovers	Jeff Beck	99
37. The Thrill is Gone	B.B. King	33
38. Rock Bottom	UFO	
39. Sympathy for the Devil	The Rolling Stones	48
40. Flying in a Blue Dream	Joe Satriani	
41. Killing in the Name	Rage Against the Machine	89
42. Sloe Gin	Joe Bonamassa	
43. Shock Me	KISS	50
44. I Believe in a Thing Called Love	The Darkness	
45. Maggot Brain	Funkadelic	71
46. Paranoid Android	Radiohead	34

[242] https://www.guitarworld.com/features/the-50-greatest-guitar-solos-of-all-time.

Song Title	**Artist/Band**	**Former (1998) Ranking, if applicable**
47. Gravity	John Mayer	
48. Nutshell	Alice in Chains	
49. Jessica	The Allman Brothers Band	47
50. Parabola	Tool	

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