INSTRUMENTS AS TECHNOLOGY AND CULTURE: CO-CONSTRUCTING THE PEDAL STEEL GUITAR

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ABSTRACT

TIMOTHY D MILLER: Instruments as Technology and Culture:
Co-constructing the Pedal Steel Guitar
(Under the direction of Mark Katz)

Through a case study of the pedal steel guitar, an instrument that emerged in the mid-twentieth century United States, this dissertation theorizes instruments as technological objects that exist within constantly evolving, mutually influential relationships among instrument makers, players, and listeners. Placing the instrument at center, I investigate how the refinement of the pedal steel's mechanisms and techniques have both responded to and shaped the aesthetic and commercial priorities of country and other popular music since the 1950s. I also show the relationship between individual musicians and their instruments to illuminate the intersections of technology, culture, and human agency. My analysis of the pedal steel guitar illustrates that instruments are co-constructed objects, not only embodying the ideas of makers and musicians, but also influencing their use through the cultural knowledge embedded in their design. In doing so, I offer new means to account for the role of musical technologies in performance practice and genre formation, and new insight into the impact of instruments on the embodied experience of individual musicians. Beyond its applications to the study of music, my analysis of instruments reveals how individual users embrace, reject, manipulate, and reinterpret the function and significance of technology, and thus negotiate their own places in the collective of society.

For Jessie and Violet

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INTRODUCTION

Imagine yourself seated at a machine operated by eight foot pedals, four knee levers, and a horizontal slider. You begin operating this device with your left hand on the slider, the second pedal depressed with one foot, and your knee pressing the leftmost lever. Release the pedal and move your hand to the right. Re-engage the knee lever. Move your knee back and press pedals one and two. Move your hand right and release pedal two, then slide back to the left, alternately pressing pedal one and the knee lever. After a few similar operations, conclude with this final sequence: pedals one and two down; one up, knee to the right; two up, other knee to the left; knee off, tap on two.

Although one might imagine this operation resulting in the destruction of a building by means of a wrecking ball, it could also produce something that sounds like this:

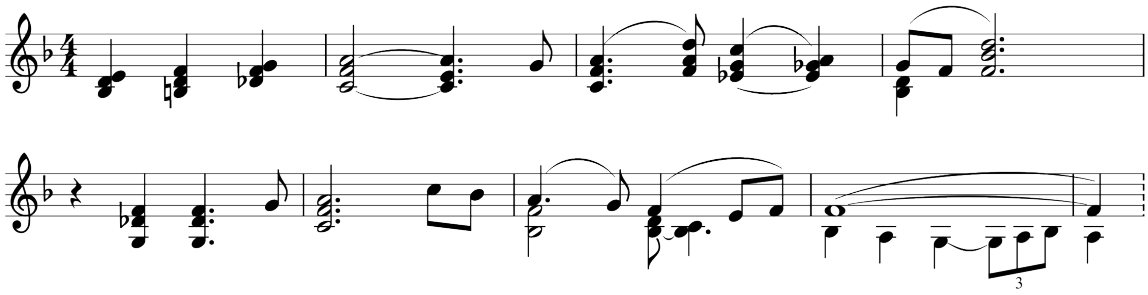

Figure I-1. Excerpt from Buddy Emmons, "Danny Boy," from *Emmons Guitar, Inc.*, Emmons Guitar Company ELP-1001, ca. 1971 [0:27–0:56].

My point in narrating this early 1970s recording of "Danny Boy" by pedal steel guitarist Buddy Emmons as a series of mechanical operations is to highlight an inescapable fact of

instrumental performance: that it arises out of the interaction of human physiology and a technological object.

In this dissertation, I propose an approach to the study of musical instruments that incorporates theories and concepts taken from Science and Technology Studies in addition to those of ethnomusicology, historical musicology, and organology. I will illustrate the application of this approach through a case study of the pedal steel guitar, an instrument that developed in the context of country music in mid-twentieth-century America.

Instruments as Technology: Philosophical and Theoretical Approaches

Although instruments are commonly acknowledged to be technological objects, they are not typically viewed in the same way as other technologies. Rather, they are frequently anthropomorphized through the naming of their components after parts of the human body (head, neck, etc.), classified in terms of species and genera, and described in terms of their evolution, as if flora or fauna.[1] Much of this work is grounded in attempts by the early proponents of comparative musicology to trace the origins of music to a single source and thus prove the universality of music.[2] More recent research has even attempted to use models of genetic distribution to track the historical dissemination of

[1] These tendencies are most baldly displayed in the generation of classification systems. For an analysis of both Western and non-Western systems, see Margaret J. Kartomi, *On Concepts and Classifications of Instruments* (Chicago and London: The University of Chicago Press, 1990).

[2] The best-known examples of this approach come from the works of Curt Sachs. See Curt Sachs, *The History of Musical Instruments* (New York: W.W. Norton & Company, 1940); and Curt Sachs, *The Wellsprings of Music*, ed. Jaap Kunst (The Hague: M. Nijhoff, 1962).

instruments.[3] These approaches represent an idea of progressive evolution that was common to early twentieth-century scholars, and saw the instruments of the present as the culmination of centuries of growth. As organologist Laurence Libin points out, attempts to apply an evolutionary model to the study of instruments represent a common misinterpretation of Darwin's theories, which in fact view natural selection as contingent upon successful adaptation to the environment rather than "an innate tendency to progressive development."[4] More recent scholarship, particularly in the realm of ethnomusicology, has tended to embrace a more contextual consideration of the role of instruments within geographically and temporally disparate cultures.

Following anthropologist Clifford Geertz, scholars working from the perspective of "ethno-organology" have considered instruments as strands in the larger "web of culture."[5] Such studies have investigated the relationship of instruments to religion, politics, ethnicity, and social structures, and often incorporate participant-observation ethnography.[6] This methodology aims towards what ethnomusicologist Mantle Hood termed "bi-musicality"—an intimacy with a second culture born from immersive

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[3] Ilya Tëmkin, "The Evolution of the Baltic Psaltery: A Case for Phyloorganology," *Galpin Society Journal* 57 (May 2004): 217, 219-–30.

[4] Quoted in Laurence Libin, "Progress, Adaptation, and the Evolution of Musical Instruments," *Journal of the American Musical Instrument Society* 26 (2000): 192.

[5] Clifford Geertz, *The Interpretation of Cultures* (New York: Basic Books, 1973), 5.

[6] Examples include Paul F. Berliner, *The Soul of Mbira: Music and Traditions of the Shona People of Zimbabwe*, reprint edition (Chicago: The University of Chicago Press, 1993); Allyn Miner, *Sitar and Sarod in the 18th and 19th Centuries* (Wilhelmshaven: F. Noetzel, 1993); Cecelia Conway, *African Banjo Echoes in Appalachia: A Study of Folk Traditions* (Knoxville: University of Tennessee Press, 1995); Steve Waksman, *Instruments of Desire: The Electric Guitar and the Shaping of Musical Experience* (Cambridge, MA: Harvard University Press, 1999); Adrian McNeil, *Inventing the Sarod: A Cultural History* (Calcutta: Seagull Books, 2004); Robert L. Stone, *Sacred Steel: Inside an African American Steel Guitar Tradition* (Urbana: University of Illinois Press, 2010). For a relevant discussion of participant-observation, see John Baily, "Learning to Perform as a Research Technique in Ethnomusicology, *British Journal of Ethnomusicology*, 10, no. 2 (2001): 85–98.

experience.[7] Although a number of scholars of Western music have also sought to incorporate their own playing experience into critical and philosophical analyses of music, their approaches have been methodologically and discursively idiosyncratic.[8] My dissertation seeks to generate a working vocabulary for uniting descriptions of the experiential aspects of musical instrument performance with the intrinsic relationships among a player's mind, body, and instrument.

A good starting point for rethinking this relationship is philosopher Martin Heidegger's 1949 essay, "The Question of Technology," in which technology is not simply the tools to accomplish various ends, but rather a mindset in which tools both reflect our understanding of reality, and act as a means to shape reality to our will.[9] Heidegger and his contemporaries, including Karl Jaspers, were, however, quick to establish a dichotomy between "good" technology, and "bad" technology, which Jaspers went as far as to call "demonic."[10] Placing technology and science in perpetual opposition to"authentic" reality, these writers pit the increasingly automated machinery of factory production lines against tools that are used to mechanically amplify or enhance basic human movements.[11] The latter is seen not to interfere with "authentic" human

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[7] Mantle Hood, "The Challenge of 'Bi-musicality'," *Ethnomusicology* 4, no. 2 (May 1960): 55–59.

[8] Examples include: David Sudnow, *The Ways of the Hand: The Organization of Improvised Conuduct* (Cambridge, MA: Harvard University Press, 1978); Naomi Cumming, *The Sonic Self: Musical Subjectivity and Signification* (Bloomington and Indianapolis: Indiana University Press, 2000); Charles Rosen, *Piano Notes: The World of the Pianist* (New York: The Free Press, 2002); Carolyn Abbate, "Music—Drastic or Gnostic?" *Critical Inquiry* 30 (Spring 2004): 505–36; Elisabeth Le Guin, *Boccherini's Body: An Essay in Carnal Musicology* (Berkeley: University of California Press, 2006).

[9] For an extensive analysis of Heidegger's philosophy of technology see Peter-Paul Verbeek, *What Things Do: Philosophical Reflections on Technology, Agency, and Design* (University Park: Pennsylvania State University Press, 2005), 49–95.

[10] Verbeek, *What Things Do*, 17.

[11] Verbeek, *What Things Do*, 10.

experiences, while the former is considered responsible for alienating humans from both nature and themselves. This line is naturally difficult to define, however, and the later writings of Jaspers in particular show the ostensibly black-and-white divide replaced with the notion that technology is itself neither good nor bad, but a neutral force that it is up to humans to use in a responsible manner. This reading of technology as neutral aligns with the humanistic tendency to privilege the workings of the mind over those of the body, and is countered by historian Melvin Kranzberg's first "Law of Technology": "Technology is neither good nor bad, nor is it neutral…technology's interaction with the social ecology is such that technical developments frequently have environmental, social, and human consequences that go far beyond the immediate purpose of the technical devices and practices themselves, and the same technology can have quite different results when introduced into different contexts or under different circumstances."[12]

The mutually influential relationship between humans and technology has more recently been taken up in the field of Science and Technology Studies, particularly through the theories of the Social Construction of Technology (SCOT).[13] This framework describes a process through which a piece of technology is developed, stabilized, and disseminated to the public.[14] During this process, the use and meaning of a given technology is negotiated among *relevant social groups* such as designers, engineers, and users. After an initial period of *interpretive flexibility*, a dominant meaning is stabilized

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[12] Melvin Kranzberg, "Kranzberg's Laws," *Technology and Culture* 27, no. 3 (July 1986): 545–46.

[13] See for example, Wiebe E. Bijker, Thomas P. Hughes, and Trevor J. Pinch, eds., *The Social Construction of Technological Systems: New Developments in the History and Sociology of Technology* (Cambridge, Massachusetts: MIT Press, 1987).

[14] Trevor Pinch and Frank Trocco, "The Social Construction of the Early Electronic Music Synthesizer," in *Music and Technology in the Twentieth Century*, ed. Hans-Joachim Braun (Baltimore and London: The Johns Hopkins University Press, 2002), 67.

and the technology is adopted into a fixed role. As such, it is said to have reached a point of *closure*.

Although the earliest analyses of SCOT writers can be read as propagating a determinist relationship between technology and users, scholars have subsequently drawn on concepts from narrative theory, actor-network theory and other approaches to develop a new frame that foregrounds the agency of individual users to resist, reject, or renegotiate established meanings and uses of technology.[15] Scholars such as Madeleine Akrich and Bruno Latour have proposed that technologies are imbued with *scripts* that provide a guide for the use of objects, but are subject to revision or rewriting in the hands of human agents.[16] In the case of music, this can be seen in traditional instruments that are employed in untraditional ways, and in the retasking of objects not intended as instruments for musical purposes.[17] The resistance of users to the proscribed limits of technology is an example of the dynamics of a relationship that can be called *co-construction*. Within a co-constructive relationship, the form, function, and meaning of technologies are negotiated through a feedback loop involving the makers of artifacts and their users, as well as the artifacts themselves. As Latour theorizes, technological objects

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[15] See Wiebe E. Bijker and John Law, eds., *Shaping Technology/Building Society: Studies in Sociotechnical Chang*e (Cambridge, MA: The MIT Press, 1992); David Nye, "Doe Technology Control Us?" in *Technology Matters: Questions to Live With* (Cambridge, MA: MIT Press, 1994), 17–31; and Nelly Oudshoorn and Trevor Pinch, eds., *How Users Matter* (Cambridge, MA: The MIT Press, 2003).

[16] Madeleine Akrich and Bruno Latour, "A Summary of Convenient Vocabulary for the Semiotics of Human and Nonhuman Assemblies," in *Shaping Technology/Building Society: Studies in Sociotechnical Change*, ed. Wiebe E. Bijker and John Law (Cambridge, Massachusetts: The MIT Press, 1992), 261.

[17] See, for example, the discussion of the hip-hop turntable as a musical instrument in Mark Katz, *Groove Music: The Art and Culture of the Hip-Hop DJ* (New York: Oxford University Press, 2012), 61–66.

do not exert direct control over human agents, but nonetheless influence their perception, understanding, and actions.[18]

Echoes of many of these philosophical and theoretical ideas can be seen in the discourse surrounding musical instruments, particularly since the early twentieth century. Arguments have been applied to the relationship between "authentic" music and technology through criticisms of devices ranging from recording and playback devices to digital samplers to auto-tune.[19] At the crux of these arguments is a tension between individual musical expression and the automation of musical experience, be it performance or listening.[20] A variety of oppositional pairs arises in these discourses—analog vs. digital, live vs. recorded, acoustic vs. electric—which are typically employed to champion the more "honest" efforts of musicians working with familiar tools in well-established contexts. A more critical look at the role of instruments in the relationship between humans and music reveals, however, that all instruments provide some level of automation that mediates the transition from musical thought to musical sound. Perhaps the most pervasive example of this automation is the shaping of instruments to match the culturally-specific demands of tuning systems, be they equal temperament in the Western world, the srutis of Hindustani music, the microtones of Turkish music, or the individual "chunings" of Shona mbira players. Even within each of these systems, the morphology

[18] Bruno Latour, *Reassembling the Social: An Introduction to Actor-Network Theory* (Oxford: Oxford University Press, 2005), 54-56.

[19] For a discussion of the issues surrounding digital technology, performance, and listening, see Katz, *Capturing Sound* (University of California Press, 2010), 146–76.

[20] Geoffrey Hindley suggests that the mechanical automation of the piano and other keyboard instruments reflects a distancing from the immediacy of musical instruments that are played "directly," and that the dominance of these instruments in the Western musical tradition fostered a separation from the "organic[ism] of the natural world." Geoffrey Hindley, "Keyboards, Crankshafts, and Communication: The Musical Mindset of Western Technology," *Music and Technology in the Twentieth Century*, ed. Hans-Joachim Braun (Baltimore and London: The Johns Hopkins University Press, 2002), 33–42.

of different instrument types affects the level of automation experienced by musicians – the lip tuning of brass and woodwind instruments, the fixed or moveable frets of lutes, the predetermined tunings of keyboard instruments.

I contend that musical instruments provide an ideal focus for a theoretical approach based on the ideas of co-construction and technological scripts, due to the inherent dialogue between individual creativity, cultural traditions, and technological objects that constitutes the art of music.[21] In order to interrogate these multiple aspects of the human-instrument relationship, I build on the terminology established by Akrich and Latour to distinguish three types of technological scripts: the mechanical, the musical, and the cultural. In what follows, I offer a working definition of each of these categories, highlighting the different source materials and methodologies with which they each engage. First, however, I provide a brief introduction to the pedal steel guitar, outlining its physical features and its primary cultural contexts.

A Brief Introduction to the Pedal Steel Guitar

Morphologically, the pedal steel guitar (or pedal steel) is an instrument with a high degree of mechanization, and relies on highly specialized knowledge and equipment. Culturally, it belongs to a genre that emphasizes simplicity—country's proverbial "three chords and the truth." Its genesis and development occurred entirely in the twentieth century United States, and is documented in a diverse body of source

[21] One of the seminal works of the SCOT literature is in fact centered on a musical instrument, albeit one that is more closely aligned with the existing conception of "music technology" than the objects of my study: the analog synthesizer. Trevor Pinch and Frank Trucco, *Analog Days: The Invention and Impact of the Moog Synthesizer* (Cambridge, MA: Harvard University Press, 2002).

materials that affords avenues of inquiry unavailable to artifacts from other eras and cultural milieus.[22]

The pedal steel is an extension of the Hawaiian steel guitar tradition, a practice in which a standard acoustic guitar lies across the lap while the performer uses a steel bar (also called the *tone bar* or *steel*) held in the left hand to stop the strings (see Figure I-2).

Figure I-2. Hawaiian steel guitar in playing position. Photograph by the author.

The use of the bar generally confines the player to the tones available across a single fret. Consequently, the steel guitar is usually tuned to some configuration of a major chord. In the case of the Hawaiian steel guitar, the most common tuning was that of A major—from top to bottom (E4-C#4-A3-E3-A2-E2), but players used a wide variety of other tunings, usually based on closely related keys such as E major (E4-B4-G#3-E3-B2-E2), which could be achieved by retuning the second, third, and fifth strings (see Figure I-3).

[22] For a more detailed history, see Timothy D. Miller, "The Origins and Development of the Pedal Steel Guitar," M.M. thesis, University of South Dakota, 2007. The only other scholarly treatment of this instrument to date is Kenneth Brandon Barker, "The American Pedal Steel Guitar: Folkloric Analyses of Material Culture and Embodiment," Ph.D. dissertation, University of Louisiana at Lafayette, 2012. This dissertation was not available prior to the writing of this study.

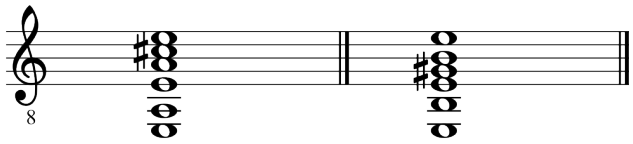

Figure I-3. Hawaiian steel guitar tunings in A major and E major.

Following the introduction of electromagnetic amplification in the 1930s came small, solid-bodied instruments called lap steel guitars. Some of these electric lap steels retained the standard six-string configuration, while others were augmented to include seven to ten strings. The problem of multiple tunings was obviated by the addition of second, third, and even fourth necks (with the instruments now mounted on legs), each configured for a different tuning (see Figure I-4).

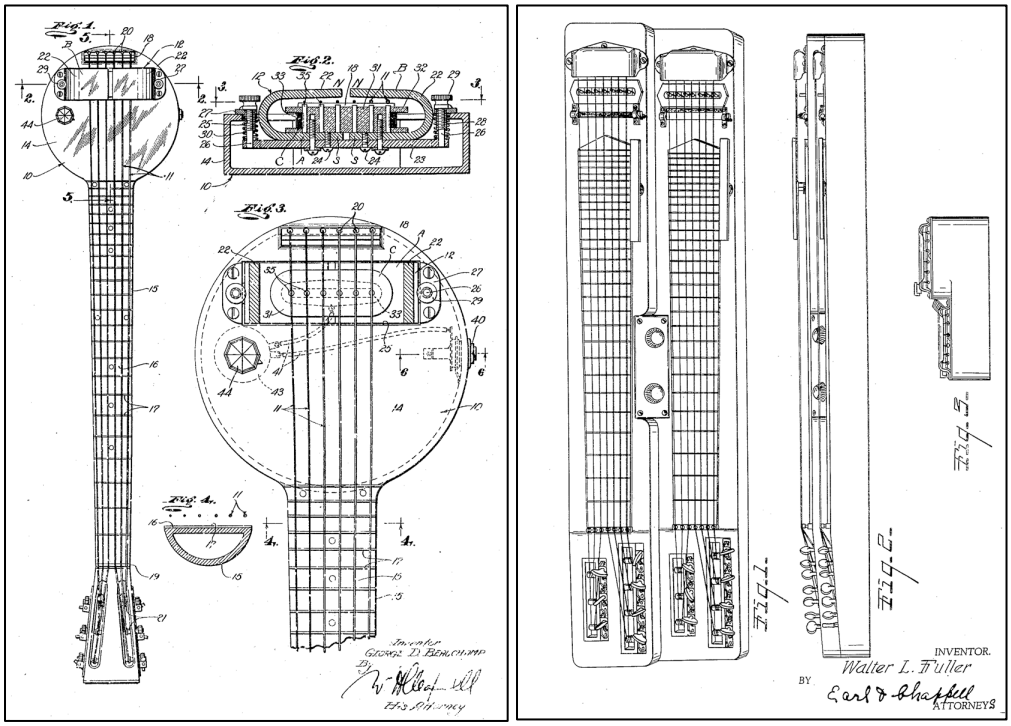

Figure I-4. Detail from George D. Beauchamp, *Electrical Stringed Musical Instrument*, United States Patent 2,089,171, 2 June 1934 (10 August 1937) (left); and Detail from Walter L. Fuller, *Design for a Hawaiian Guitar*, United States Patent Des. 110,178, 28 April 1938 (21 June 1938) (right).

In the late 1930s and early 1940s, various devices were added to single-neck lap steels as a means to rapidly change between several popular tunings by altering the pitch of one or more strings. These devices included hand-operated dials, knee levers, and foot pedals. As this study discusses, these devices provided the foundation for the emergence of the pedal steel guitar in the late 1940s, which underwent a series of developments and transformations before reaching its modern form in the mid-1970s.

In its typical modern form, the pedal steel consists of one or two 10-string necks, the strings of which are affected by three to eight foot pedals and four or five knee levers, which function similarly to the pedals. Each neck is configured with a different tuning and a corresponding array of pitch changes, all controlled by an intricate collection of mechanisms. The focus of this study is the tuning known as the E9th, or E9 tuning. Like the Hawaiian steel guitar, the E9 tuning is centered on a major triad, in this case E major, which is found on strings 3, 4, 5, 6, 8, and 10 (see Figure I-5). These strings are supplemented by the seventh, D, on string 9 and the ninth, F#, on string 7. Strings 1 and 2 are tuned to D# and F# below the G# of string 3. The function of the pedals and knee levers will be detailed in Chapters Two and Three.

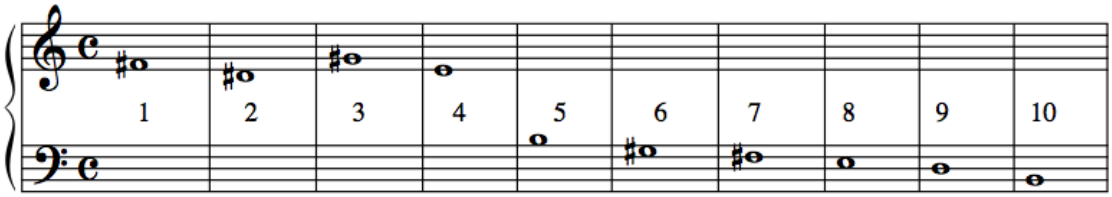

Figure I-5. E9 pedal steel guitar tuning.

The placement of the highest string in a position other than the first string creates a *reentrant tuning*, a tuning in which the typically sequential ordering of strings is disrupted. This type of tuning often creates a group of strings that are within a step of one

another, and is a feature of such instruments as the five-string banjo, the baroque guitar, and the chitarrone (a bass lute of the late Renaissance), each of which fostered their own idiosyncratic techniques around this feature. On all of these instruments, the overlapping strings can be used to play figures in which the notes of a scale are left to ring against one another, creating a bell-like effect. On the pedal steel, this feature also allows for many scalar passages to be executed without moving the bar.

Technological Scripts

As this study will demonstrate, the development of the modern pedal steel was the result of a co-constructive dialogue among makers, players, and instruments within specific cultural contexts. This evolution can be discussed in terms of the interplay of the technological scripts that surrounded its use and meaning. I divide technological scripts into four categories: the mechanical, the musical, the cultural, and the personal.

Mechanical Scripts

An instrument's mechanical scripts are the operations that are intended and enabled by its design, and the tasks that it automates. The mechanical scripts for a piano, for example, include operational elements such as the length of one or more strings by the activation of keys, and the manipulation of the duration of notes via the sustain pedal. The design of the modern piano enables these operations to be finely controlled in terms of intensity and volume, the latter of which is bolstered by the physical properties of the body's steel frame. The automation provided by the piano exists on several levels. First and foremost, it automates the pitches of its notes providing all of the members of the twelve-note scale in multiple octaves. This automation obviates the need for intonation

control on the part of the player, but it also eliminates the possibility of reaching beyond the fixed scale within the normal scope of its use. The mechanical aspects of the instrument, therefore, establish a number of parameters that influence the activities of its users.

The examination of mechanical scripts aligns most closely with the field of organology, which has traditionally focused on the physical facts of musical instruments—dates of invention, materials, measurements, and maker biographies. The primary sources for the study of mechanical scripts are the instruments themselves, which can be studied through physical examination, photographic evidence, catalogs, and instruction manuals. Additionally, the intentions, visions, and rationales of twentieth-century designers are often recorded in patents. These documents offer valuable insight into the priorities and goals of instrument makers, and to some extent the cultures in which they work. Patents must be approached with caution, however, as the intentions of designers are often ignored or subverted by a technology's end users.

Musical Scripts

An instrument's musical scripts are the patterns in which players and composers use it, both collectively and on an individual level. These patterns include readily observable phenomena such as characteristic sounds and gestures (turning again to the piano, this would include left-hand techniques such as the Alberti bass, Harlem stride, and Boogie Woogie), and the more subtle effects that an instrument's design have on the musical thinking of its players. The idea of instrument-influenced thinking has parallels in the field of music cognition, but most of this literature generally treats the role of

instruments as incidental—as a means of execution secondary to the goings-on of the brain.[23] A small group of scholars, however, has begun to explore the importance of the body, and its interactions with instruments, as an agent in the cognitive process. One such scholar is musicologist Marc Leman, whose theory of "embodied music cognition" focuses on the physiological rather than the psychological, and views the interactive process of instrumental performance as a means by which a player learns music on an unconscious level.[24]

My concept of musical scripts builds in particular on the work of ethnomusicologist John Baily, who has investigated the influence of instrument morphology on music cognition in several disparate cultural contexts. Baily demonstrates that the physical characteristics of two Afghani lutes, the rubab and the dutar, exert a clear influence on the melodic contours and figurations of their respective repertories.[25] He theorizes that players and composers work within a "motor grammar…[grounded in] a spatial framework determined by the layout of the instrument."[26] Baily's efforts echo the pioneering work of his mentor, John Blacking, whose investigation of the

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[23] These include the perception of pitch, rhythm, and meaning; the acquisition of motor skills; and the nature of musical memory. Studies that focus on the acquisition of musical skills such as sight-reading and improvisation often acknowledge particular challenges of certain instruments, but assume that expert musicians will possess sufficient proficiency to render the difficulties inconsequential. See, for example, John Sloboda, *Exploring the Musical Mind: cognition, emotion, ability, function* [sic] (Oxford: Oxford University Press, 2005); Richard Colwell, ed., *MENC Handbook of Musical Cognition and Development* (Oxford: Oxford University Press, 2006); Dina Kinarkaya, *The Natural Musician: On Abilities, Giftedness, and Talent*, translated from the Russian by Mark H. Teeter (Oxford: Oxford University Press, 2009).

[24] Marc Leman, *Embodied Music Cognition and Mediation Technology* (Cambridge, MA: The MIT Press, 2008), xiii, 138.

[25] A summary of his research is presented in John Baily, "Music Structure and Human Movement," in *Musical Structure and Cognition*, ed. Peter Howell, Ian Cross, and Robert West (London: Academic Press, 1985), 237-258

[26] Baily, "Music Structure," 237–38, 242. In a later article he co-authored, this theory is applied to the folk guitar. John Baily and Peter Driver, "Spatio-Motor Thinking in Playing Folk Blues Guitar," *The World of Music* 34, no. 3 (1992): 59.

lamellaphone music of the Nsenga people of southern Africa found that its repertoire was unified by patterns of movement rather than patterns of sound.[27] A practical application of the spatial frameworks provided by instruments is in the transposing instruments of the woodwind family and some stringed instruments, particularly the consorts of different sized instruments popular in Renaissance Europe, in which the use of stable systems of fingerings allowed players to easily move between instruments tuned to different keys and pitch levels. Taken to an extreme, however, Baily's thesis implies a kind of instrumental determinism, in which instruments are granted a degree of control over their players, "encourag[ing] the use of some kinds of movement patterns and tend[ing] to inhibit others in performance."[28] I temper this tendency by extending Ingrid Monson's theory of *perceptual agency*, which holds that listeners and performers can selectively shift their focus when hearing music, to encompass not just hearing, but the cognitive and ideational aspects of performance.[29]

In approaching the musical scripts of the pedal steel, I draw on several streams of evidence. My primary focus is on recordings, capitalizing on the fact that many of the key moments of the instrument's development are documented on commercial recordings. In fact, it is largely through these recordings that the instrument's techniques were disseminated among players and introduced to listeners. I supplement my transcriptions with statements made by the players themselves, giving priority to materials contemporaneous to the recordings. Finally, I draw on my own experience

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[27] John Blacking, "Patterns of Nsenga *Kalimba* Music," *African Music* 2, no. 4 (1961): 2–30.

[28] He acknowledges the limitations of these tendencies, particularly in the case of advanced musicianship. Baily, "Music Structure," 252, 256; Baily and Driver, 59.

[29] Ingrid Monson, "Hearing, Seeing, and Perceptual Agency," *Critical Inquiry* 34, supplement (Winter 2008): S36.

learning the instrument over the past eight years, which involved not only applying my existing knowledge of music theory and stringed instrument techniques, but also lessons and informal communications with both professional and amateur players.

Cultural Scripts

One of the most effective models of the functioning of musical communities is found in the work of sociologist Howard Becker. As Becker theorizes, the production of art is a collective action that, in its most developed form, leads to the establishment of self-contained "art worlds."[30] Each of these worlds consists of a network of individuals and institutions that play essential roles, from the minutia of the creation of tools and materials to the governing and sanctioning of policies and practices.[31] Though the end result of this process is a self-reinforcing system of conventions, Becker's work is grounded in the claim that their establishment relies on the choices made by individual participants.[32]

Within my theoretical model, this system of conventions constitutes a technology's cultural scripts—socially constructed ideas about how and when an object should be used, and the goals it is intended to facilitate. In the case of the piano, for example, the dominant cultural scripts of the early twentieth-century U.S. centered on its use in the concert hall both as a solo instrument and in ensembles, and as the centerpiece

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[30] Howard S. Becker, *Art Worlds* (Berkeley; Los Angeles; London: University of California Press, 2008).

[31] The means by which behaviors are monitored, assessed, and policed is discussed in Howard Becker, *Outsiders: Studies in the Sociology of Deviance* (New York: Free Press, 1963).

[32] Howard S. Becker, "The Work Itself," in *Art From Start to Finish: Jazz, Painting, Writing, and Other Improvisations*, ed. Howard S. Becker, Robert R. Faulkner, and Barbara Kirschenblatt-Gimblett (Chicago and London: The University of Chicago Press, 2006), 26.

of music making in the home. In each of these venues it carried different associations with class, and gender, all tied to its existence as an object that is made, consumed, and interpreted by communities of people. These communities can be local—based on geographic proximity; "imagined"—either as a perceived unity or as a technologically mediated non-local group; or invisible—carrying the indelible traces of social construction that remain even if one does not actively participate in society.[33]

In the case of the pedal steel, several types of community impacted its development: that of the country music industry, that of the community of professional players in Nashville and California, and that of amateur musicians throughout the United States. Country music has been studied by an ever-expanding field of scholars, who are deftly exploring its relationship to issues of society, economics, politics, gender, and race.[34] The professional musicians of country music have received scant attention, however; as a social/musical group, jazz musicians have received considerably more attention than other performers, with examinations of their learning processes, their

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[33] The concept of imagined communities is drawn from Benedict Anderson's work on nationalism. Benedict Anderson, *Imagined Communities: Reflections on the Origin and Spread of Nationalism*, 2nd edition (London and New York: Verso, 1991), 5–7.

[34] Overviews of the genre are found in Bill C. Malone and Jocelyn R. Neal, *Country Music U.S.A.*, 3rd edition (University of Texas Press, 2010); and Jocelyn R. Neal, *Country Music: A Cultural and Stylistic History* (New York: Oxford University Press, 2013). Issues of the music industry are discussed in Paul Hemphill, *The Nashville Sound: Bright Lights and Country Music* (New York: Ballantine, 1970); William Ivey, "Commercialization and Tradition in the Nashville Sound," in *Folk Music and Modern Sound*, ed. William Ferris and Mary L. Hart (Jackson: University of Mississippi Press, 1982); Joli Jenson, *The Nashville Sound* (Nashville: The Country Music Hall of Fame Press and Vanderbilt University Press, 1998); Craig Havighurst, *Air Castle of the South: WSM and the Making of Music City* (Urbana and Chicago: University of Illinois Press, 2007); and Diane Pecknold, *The Selling Sound: The Rise of the Country Music Industry* (Durham, NC: Duke University Press, 2007). Intersections with politics are discussed in Peter La Chapelle, *Proud To Be an Okie: Cultural Politics, Country Music, and Migration to Southern California* (Berkeley: University of California Press, 2007); and Travis D. Stimeling, *Cosmic Cowboys and New Hicks: The Countercultural Sounds of Austin's Progressive Country Music Scene* (New York: Oxford University Press, 2011).

interpersonal communications, and their practice habits.[35] The professional musicians of Nashville and California have more in common with jazz musicians than is obvious, however, with their day jobs in the recording studios balanced by late-night jam sessions and head-to-head improvisational competitions.

Personal Scripts

A common thread that I wish to address with my analyses is the fluid movement of individual musicians between different musical, social, economic, and geographical contexts. Just as the recording studio is different from the dancehall and the honky tonk, the practice room is a place apart from all of these things, where musicians and their instruments form a culture of two. I strive to account for the intimate, formative relationship between musicians and their instruments by discussing the *personal scripts* of individual players. Each player's personal scripts are the product of their engagement with the mechanics of their instrument, the musical ideas of other musicians (including those who play the same instrument and those who play other instruments), and the aesthetic and conceptual frameworks of the music that they perform, listen to, or learn in a formal setting.[36] I distinguish two separate aspects of this co-constructive dialogue

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[35] A notable exception is Tracey E. W. Laird, *Louisiana Hayride: Radio and Roots Music Along the Red River* (New York: Oxford University Press, 2005). Paul F. Berliner, *Thinking in Jazz: The Infinite Art of Improvisation* (Chicago and London: The University of Chicago Press, 1994); Ingrid T. Monson, *Saying Something: Jazz Improvisation and Interaction* (Chicago: University of Chicago Press, 1996); Robert Faulkner, "Shedding Culture," in *Art From Start to Finish: Jazz, Painting, Writing, and Other Improvisations*, ed. Howard S. Becker, Robert R. Faulkner, and Barbara Kirschenblatt-Gimblett (Chicago and London: University of Chicago Press, 2006), 91–117.

[36] This study focuses primarily on the interactions among steel guitarists as a discrete community united by the specialized knowledge surrounding the instrument, its technology, and its music. As Joti Rockwell has demonstrated, however, musical ideas are frequently passed among performers of disparate instruments, reflecting broader dialogues about musical genre and style. Joti Rockwell, "Drive, Lonesomeness, and the Genre of Bluegrass Music," Ph.D. dissertation, University of Chicago, 2007.

between players and instruments: *instrumental ideation*, a term I use to discuss the influence of instruments on the creative process, and *vernacular music theory*, which represents the analytical aspect of the player-instrument relationship, ranging from a solo performer's general sense of how notes and chords relate to one another to complex systems of implicit or explicit rules that govern group performances.[37]

Outline of Chapters

In Chapter One, I analyze the development of the steel guitar in the United States leading up to the emergence of the pedal steel guitar in the early 1950s using the concepts of technological scripts. I begin by examining the transformation of the Hawaiian steel guitar from an exotic "other" to an essential part of the American soundscape. I show this shift in reception to be the result of changes in the instrument's adoption into existing and emerging practices in the U.S., including the art music-derived, notation-based culture of plucked string parlor music, and the vernacular music of the American South, including early country music and the blues. I then show how the advent of electrical amplification fostered the steel guitar's adoption into new musical contexts, particularly in commercial

[37] My use of this term is inspired by Rayvon Fouché's concept of *vernacular technological creativity*, which he employs to discuss the "creation, development, and use of technology by those racially marginalized [from the dominant cultures of Western society]." See Rayvon Fouché, "Say It Loud, I'm Black and I'm Proud: African Americans, American Artifactual Culture, and Black Vernacular Technological Creativity," *American Quarterly* 58, no. 3 (2006): 639–61. Whereas terms such as *ethnotheory* are often employed to discuss the distinct discourses of specific musical cultures, particularly those of non-Western musics, I use vernacular music theory to highlight the ways in which the discourse of pedal steel guitarists (and other popular musicians) draw on the core concepts and terminology from Western music theory without necessarily engaging with its dominant discourses. For more on ethnotheory, see Stephen Feld, *Sound and Sentiment: Birds, Weeping, Poetics, and Song in Kaluli Expression* (Durham, NC: Duke University Press, 2012); Jean Jacques Nattiez, *Music and Discourse: Towards a Semiology of Music*, trans. Carolyn Abbate (Princeton, NJ: Princeton Univesity Press, 2000), 193–99; Kofi Agawu, *Representing African Music: Postcolonial Notes, Queries, Positions* (New York: Routledge, 2003), 181–83.

country music, and the introduction of new forms and tunings, leading to the invention of pitch-changing devices that contributed to the development of the pedal steel guitar.

In Chapter Two, I examine the establishment of the pedal steel guitar's modern form from its emergence at the end of the 1940s to the mid-1970s. The development of the pedal steel's technology is seen in thirty patents issued between 1938 and 1976, which document not only the function of their mechanisms, but also the ideas that sparked their invention. The designs of inventors were then explored, refined, or rejected by individual steel guitarists, who created new musical scripts that I trace through transcriptions of tracks recorded between 1947 and 1975.

Turning to its cultural contexts, I examine the dialogue between pedal steel players and instrument makers within the context of the commercial country music industry, where its use was guided by the tastes of record executives, producers, and artists, and other outside forces. Although the early 1960s saw a marked expansion of the instrument's capabilities and a steady refinement of its mechanisms, the constraints placed on steel guitarists in the context of country recordings led some players to seek out venues to explore alternative musical scripts. By the late 1960s, the pedal steel's status as an unmistakable marker of country music was confirmed by its adoption into the burgeoning genre of country rock, where new musical ideas contributed to the emergence of a loosely canonized body of aesthetics and repertory that defined the country pedal steel's sonic and cultural identity.

In Chapter Three, I show how the mechanical, musical, and cultural scripts of the pedal steel interact with the personal scripts of individual players, through the process of instrumental ideation and their instrument-driven adaptations of music theory. I begin by

introducing a basic approach to scales, harmony, and chord progressions, drawing on my own experience studying the instrument. I then turn to three case studies that explore the mechanical setups, ideations, and musical theorizing of pedal steel innovators Buddy Emmons, Ralph Mooney, and Lloyd Green. Through analyses of selected recordings of these three players from the 1950s to the 1970s, as well as their own statements about playing, I explore the interconnections among their musical biographies, their histories with the steel guitar, and their individual approaches to playing and thinking about music.

In Chapter Four, I discuss the process of *closure*—the way in which a technology is rendered stable through the explicit or implicit agreement of the majority of its users. The stabilization of the instrument can be seen first in the establishment of a (mostly) standardized form and the introduction of less expensive, entry-level instruments aimed at the amateur market, which established a base line for what a pedal steel sounded like, and how it could operate. The musical uses of the pedal steel reached effective closure through a shift in their dissemination from oral transmission to the written word, with the publication of the first pedal steel instruction manuals fostering a change in emphasis from exploration and innovation to the mimesis of past explorers and innovators. This pattern was reinforced by the emergence of a canon of recordings, through which amateurs could study the techniques and styles of players both past and present, and legitimized by a new network of communities that mitigated the typically individual experience of learning pedal steel with a socially constructed body of knowledge.

In my Conclusion, I show that closure is itself an act of interpretation by its users. Although the events of the 1970s fostered the standardization of many aspects of the pedal steel guitar's mechanical, musical, and cultural scripts, players retained their

individual agency, just as the individual players of the 1950s and 1960s pursued their own personal scripts while navigating the demands of the music recording industry. I demonstrate the continued transformation of the pedal steel tradition through the work of two very disparate players: Nashville session musician Paul Franklin and avant-garde musician Susan Alcorn. Together, these two players demonstrate that although the stabilization and standardization of the pedal steel's form and musical style provided a clear path for beginners to follow, it also provided a clear contrast for the further innovations of advanced players. Through both ends of this spectrum, the core technical features and sonic aesthetics that define the pedal steel provide a base from which its mechanical, musical, and cultural scripts can freely expand.

In sum, this dissertation contributes to a broader understanding of the impact of instruments on musical thought and performance. Additionally, my research highlights the effectiveness of multidisciplinary approaches to the study of popular music, and emphasizes the importance of vernacular music traditions to the understanding of composition, performance, and reception. In expanding the conception of musical technologies to reincorporate traditional instruments, I provide a template for the use of the humanities to study the broader issue of the role of technology in the relationships between human minds and bodies, and the social contexts that they inhabit. Beyond its applications to the study of music, my analysis of instruments reveals how individuals negotiate their own places in the collective of society as they embrace, reject, manipulate, and reinterpret the function and significance of technological objects.

CHAPTER ONE

FORGING THE STEEL: THE STEEL GUITAR IN AMERICA, 1900–1950

The origins of the pedal steel guitar lie in the technological idea of the slide, a phenomenon that can be found in numerous incarnations throughout the world. These include the Japanese *ichigenkin* and *nigenkin*; the South Indian *gottuvadayam*; several variants of the musical bow in Africa; and the European zithers such as the Norwegian *langeleik*, the French *épinette des Vosges*, and the German *sheitholt*.[1] The direct antecedent of the pedal steel, however, is the Hawaiian steel guitar, which was developed on the Hawaiian Islands in the late nineteenth century and imported to the continental United States in the early 1900s.

In this chapter, I analyze the development of the steel guitar in the United States leading up to the emergence of the pedal steel guitar in the early 1950s. I first consider the transformation of the steel guitar from its initial status as an exotic element introduced from Hawaii in the early 1900s to its place as an essential part of the American soundscape by mid-century. I show this shift in reception to be the result of changes in the instrument's musical use and reception as it was adopted into existing and emerging practices in the U.S.: On the one hand, there was its assimilation into the art music-derived, notation-based culture of plucked string parlor music; on the other hand, there was the vernacular music of the American South, including early country music and the

[1] These instruments are discussed in Miller, "Origins and Development," 43–46.

blues, in which the steel guitar's close association with the voice fostered new connections with regional dialects and accents. I then address the effects on the steel guitar's mechanical and musical scripts that stemmed from the advent of electrical amplification, which included the introduction of a new physical form, the development of new tunings and techniques, and the instrument's adoption into new musical contexts, particularly that of commercial country music. The popularization of multiple tunings led in turn to the invention of pitch-changing devices that contributed to the further development of the pedal steel guitar.

From Exotic to Essential: The Transmission and Transformation of the Steel Guitar

The presence of the slide in the United States can be directly traced to the Hawaiian islands of the late nineteenth century.[2] The Hawaiian steel guitar employs the technology of the steel as a means of rewriting of the guitar's existing mechanical script, which is itself the product of centuries of evolution. In the context of Hawaiian music, the use of the steel is often read as providing a link to the vocal music which is at the heart of Hawaii's indigenous traditions.[3] As a plucked string instrument, the guitar is in many ways the opposite of the voice; it has a strong attack and a quick decay, its muted tone is

[2] Scholars of the blues guitar have long held that African instruments were the source (or perhaps a separate source) of the bottleneck guitar style. See, for example, David Evans, "Afro-American One-stringed Instruments," *Western Folklore* 29, no. 4 (October 1970): 229–45; and William Ferris, *Blues From the Delta* (New York: Da Capo Press, 1978). This theory is challenged by John Troutman's research on the presence of native Hawaiian musicians in the Southern United States in the first decades of the 1900s. He asserts the likelihood of a scenario in which African American musicians adopted the slide after direct exposure to Hawaiian players. John Troutman, "Steelin' the Slide: Hawai'i and the Birth of the Blues Guitar," *Southern Cultures* 19, no. 1 (Spring 2013): 26–52. Whereas Troutman's focus is on the impact of Hawaiian musicians themselves, my primary concern in this study is the transformation of the Hawaiian style as it was adopted and adapted into the broader musical life of the U.S., including its relationship to the bottleneck style, which can be definitively documented from the 1920s.

[3] Mantle Hood, "Musical Ornamentation as History: The Hawaiian Steel Guitar," *Yearbook for Traditional Music* 15 (1983): 141–48.

coupled with a dynamic range limited to a narrow spectrum on the quiet side, it is generally used to play polyphonic music, and its pitches are sharply delineated by the presence of frets. With the steel, however, both the guitar's sound and musical parameters are transformed; it is granted a significant increase in sustain and a brighter tone, as well as the ability to glide smoothly between pitches and to play notes outside of the Western chromatic scale. As observed by ethnomusicologist Mantle Hood, this fundamental change to the instrument brought it closer to the voice, and the instrumental style that emerged from the originators of this technique drew heavily on stylistic tropes of Hawaiian vocal music.[4] Some hallmarks of this style include upper-register melodies with glissandi in and out of key pitches, a "tinkling" effect created by rapid alternation of the thumb and fingers on different strings, and a pronounced vibrato.[5]

Following the importation of this new style to the mainland United States around the turn of the century, the Hawaiian guitar underwent a series of transformations. In the first several decades of the twentieth century, the Hawaiian guitar was transmitted across the United States through novelty recordings, Broadway performances, recordings of Hawaiian musicians, and amateur music making.[6] Fueled by the escapist yearnings of a society affected by World Wars and economic depression, it provided a soundtrack for American listeners' fictional constructions of Hawaii. The exoticism of the island culture associated with the instrument provided audiences and performers the opportunity to

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[4] Hood, "Musical Ornamentation," 142.

[5] A masterful analysis of the Hawaiian steel guitar style from a player's viewpoint is Stacy Phillips, *Mel Bay Presents the Art of Hawaiian Steel Guitar* (Pacific, MO: Mel Bay Publications, 1991).

[6] The most complete picture to date of the Hawaiian guitar's presence in the continental United States is found in Troutman, "Steelin' the Slide." A collection of essays and anecdotes relating to the instrument is found in Lorene Ruymar, ed., *The Hawaiian Steel Guitar and its Great Hawaiian Musicians* (Anaheim Hills, CA: Centerstream Publishing, 1996).

adopt not only a musical costume, but a physical one as well. The leis and grass skirts available from the same catalogs as ukuleles and Hawaiian guitars masked the darker side of the colonialism of the United States' annexation of the Hawaiian Islands. As the steel guitar was absorbed into U.S. culture, however, its direct association with the exoticism of Hawaii eroded, and a distinctly "American" steel guitar style began to emerge.

The spread of Hawaiian music after the turn of the century is closely related to the changing relationship between the mainland United States and its newly annexed island territory. Following the toppling of the constitutional monarchy by American-backed business interests in 1893, music became "a site of struggle over representations of Hawaii and control of Hawaiian music."[7] Unlike immigrant populations such as Chinese-Americans, whom Tin Pan Alley composers depicted as nefarious opium dealers and/or addicts in the first decade of the century, the Hawaiian people were viewed as non-threatening, and therefore safe components of escapist fantasies.[8] Beginning with a lavishly produced musical, *Bird of Paradise*, produced first in Los Angeles and then in New York City, and proceeding into sheet music for home entertainment and minstrel shows, the presentation of Hawaiian musical culture took on the character of advertising for the burgeoning Hawaiian tourist industry. Native Hawaiians were viewed as "primitive yet not frightening, sensually alluring yet safe"; they were "questioned for their island ways yet envied for living in paradise."[9] An upside of the situation was that the increasing popularization of music recording technologies and the consumption of

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[7] Charles Hiroshi Garrett, *Struggling to Define a Nation: American Music and the Twentieth Century* (Berkeley: University of California Press, 2008), 168.

[8] Garrett, *Struggling to Define a Nation*, 170.

[9] Garrett, *Struggling to Define a Nation*, 194.

recorded music allowed Hawaiian musicians to present their music in a relatively intact form alongside the derivative efforts of American songwriters.

From the stages of Broadway to the Tubize Artificial Silk Company in Hopewell, Virginia, professionals and amateurs alike donned grass skirts and leis to perform music both from Hawaii and about Hawaii. Through these performances, the musical Amateur performance was fostered in a number of settings, including industrial factories such as the Tubize Artificial Silk Company in Hopewell, Virginia, who sponsored the Tubize Royal Hawaiian Orchestra.[10] This group appeared regularly on WRVA in Richmond, Virginia, and made several recordings in 1929, including a session in October 1929, just ten days before the events of "Black Thursday" that marked the beginning of the Great Depression.

Throughout the 1910s and 1920s, Hawaiian musicians and their recordings circulated throughout the country, and many American musicians began to take up the Hawaiian guitar and ukulele. As the popularity of the Hawaiian guitar spread across the nation, however, its sound was gradually divorced from the image of Hawaii. The advent of mass-produced musical instruments and mail-order catalogs from companies such as Sears Roebuck and Montgomery Ward meant that amateur musicians gained easy access to ukuleles, Hawaiian-style guitars, and instructional materials from both native musicians and American entrepreneurs. In New York City, studio musicians adopted the instrument as part of a fluid instrumentarium that helped singers such as Vernon Dalhart manipulate his sound and image to suit whatever genre they sought to portray. One important figure in New York was multi-instrumentalist Roy Smeck, whose Hawaiian

[10] Liner notes, *Virginia Roots: The 1929 Richmond Sessions*, Outhouse Records 1001, 2002.

guitar playing was featured on some of the earliest motion pictures to include sound.[11] Smeck also published several tutors for the instrument, which treat the instrument less as an export from another culture as a novel vehicle for the performance of Western music in the art tradition.[12] Through method books such as those published under Smeck's name, as well as correspondence courses and school established throughout the United States by publishers like the Oahu Manufacturing Company of Cleveland, Ohio, the Hawaiian guitar became a fixture in the world of amateur music making.

As shown in the work of guitarist and scholar Jeffrey Noonan, plucked string instruments were extremely popular in nineteenth- and early twentieth-century America. Mandolin clubs, classical guitar, and a domesticated "classical" banjo style provided fashionable pastimes for people of all classes. The Hawaiian guitar was assimilated into this tradition, becoming one among an arsenal of instruments which shared roughly analogous playing techniques and tunings. Although the initial reception of Hawaiian music reflected a marked sense of otherness—*The New York Times*, for example, referred to it as "weirdly sensuous"[13] —it was soon embraced for its distinctiveness and marketed as familiar only a decade later:

> The haunting, wailing tone of the Hawaiian Guitar is very beautiful and the music from this instrument has taken its place along with other instruments as one of the most popular to audiences. On nearly every radio program there is an Hawaiian

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[11] *Roy Smeck, The Wizard of the String, in "His Pastimes"* (1926), Warner Brothers http://www.youtube.com/watch?v= oqg1-kZxHHU.

[12] Roy Smeck, *Modern Method For the Hawaiian Guitar* (New York: Carl Fisher, Inc., 1932). In a 1972 interview, however, Smeck states that, because he could not read music, these methods were written by the publisher. Roy Smeck, "The Wizard Reminisces" (as told to Robert Yelin) *Guitar Player* 6, no. 6 (November/December 1972): 26, 49.

[13] "'Bird of Paradise' has Scenic Beauty: Richard W. Tully's Play at Daly's Deals with Hawaii and Its Old Superstitions," *New York Times*, 9 January 1912, quoted in Garrett, *Struggling to Define a Nation*, 179.

> Guitarist and the fans are enthusiastic wherever he plays. You, too, can play this wonderful instrument.[14]

As early as 1914, music companies and entrepreneurial players across the country began to establish studios and to publish instruction manuals for the steel guitar. These method books display a range of notational approaches from idiosyncratic tablature systems to standard staff notation.[15] For the most part, these tutors treat the instrument less as a representative of another culture than as a novel vehicle for the performance of music in the Western tradition. A prevailing attitude of these teachers can be seen in an editorial from a 1938 issue of *Steel Guitar Progress*, a periodical published by guitarist Eddie Alkire that was aimed at educators and students. The author cites "the universal appeal of the instrument's tone quality," but holds that the advancement of the instrument requires a thorough understanding of "actual pitch, theory, practical harmony, arranging, and playing from piano copy."[16] No mention is made of the instrument's Hawaiian roots in this notion of its progress towards the legitimacy of a literate tradition. Although some books and schools did retain an emphasis on actual Hawaiian repertory, most focused on other material: patriotic songs such as "Yankee Doodle Dandy"; tunes from the growing American popular songbook, including many by Stephen Foster; and light classical music, such as the Brahms lullaby, Liszt's *Liebestraum*, and the Bacarolle from Offenbach's *Tales of Hoffman*. Though still making use of pictures of palm trees and hula

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[14] M. M. Cole, *5 Minute Guaranteed Hawaiian or Steel Guitar Course* (Chicago: M. M. Cole, 1926), 3.

[15] An example of the former is James F. Roach, *Hawaiian Guitar Instructor* (Cincinnati: James F. Roach, 1914); and the latter can be seen in Jay Thomas Harding, *The Steel Guitar: An Original Hawaiian Method* (New York and Chicago: Jay Thomas Harding, 1926). Some tutors provided both tablature and staff notation, in an effort to reach players of different abilities and interests.

[16] Eddie Alkire, ed. *Steel Guitar Progress* 1, no. 1 (Fall 1938): 3.

girls, these manuals actually worked to remove the exotic character of the instrument and to foster an education in the musical language of European art music.

The instructional materials published by Oahu served not only as musical instruction, but also explicitly as a broadly aimed program of cultural education. One of Oahu's publication formats was a series of individually sold sheet music folios that served as weekly lessons.[17] Most of these lessons follow the same structure: a technique- or theory-related element, several short exercises, and a song or piece notated in two parts so that the teacher could play along with the student. In addition to this musical material, the back of each folio features an educational essay, the majority of which were part of a series entitled, "Music of the Americas." The first of these articles, dated 1942, displays the highly inclusive nature of the unnamed author's definition of American music, which not only includes African American and Native American musics, but also reaches beyond the U.S. to include Central and South America:

> Let us study a bit of the music of the Americas. Let us see what makes it akin to the music of every other country, yet so different from any one of them…Let us travel along our sea coasts and listen to our sailor chanteys. Let us board our warships and our merchant vessels. Let us find our way through the hills and up steep mountain sides. Let us cross the plains and listen to the songs of the cowboys. Let us go down to the mines and over railroads, stop in hotels, listen to school bands. Let us enter the festivals and dance to the swing orchestras. Let us sit with the Indian while he tells us the song of his flute. Let us stop in the deep South to hear the jazz of our black men. Let us slip through the bayous and sing the dark melancholy blues. Let us join in the songs of the spirituals…Let us listen to the music of the Americas![18]

Indeed, after several installations that speculate on the origins of music and strongly emphasize the influence of Spanish music (particularly in the form of the guitar) on the

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[17] The author has a collection of over 50 of these folios, dated from 1942 to 1948.

[18] Oahu Publishing Company, "Oahu Modern Note Method for Steel Guitar," Vol. 1PN-X, ca. 1943.

Americas following the onset of European colonization, the author explores a wide range of repertory, including "Railroad Songs," "Cowboy Songs," "City Songs," and several lessons focused on the racial minorities of the United States.[19]

Conspicuously absent in this educational series is any emphasis on the steel guitar's Hawaiian origins.[20] The intended program of cultural education evident in the Oahu curriculum is clearly displayed in an essay outside of the "Music in the Americas" series. Written by the Rev. Msgr. E. J. Flanagan, the essay "Music Helps Our Boys," resonates with the association of music and social virtue that dates back to Plato's *Republic*, declaring music to be the "MOST POWERFUL EDUCATIONAL TOOL OF ALL THE ARTS," standing high as the "Supreme Accomplishment" of human achievement.[21] Although this message of social uplift ignores the high number of female steel guitar students, it joins with the tone of the historical series in demonstrating, through its aspirations toward a universal, forward-looking music, the steel guitar's absorption into the mainstream of the philosophical, educational, and aesthetic model that grew from the United States' European heritage.

Outside of the influence of its largely urban notation-based transmission, a shift in the aural transmission of the steel guitar occurred in the late 1920s and early 1930s. As it was adopted into vernacular practices, the Hawaiian style was combined with other styles, such as the raw, melismatic melodies of bottleneck blues guitarists. This musical

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[19] The lesson entitled "Music of the Deep South," for example, showcases a worldview that displays the tensions of the United States in the 1940s, offering a mixture of positive and problematic statements regarding the music of African Americans. Oahu Publishing Company, "Oahu Modern Note Method for Steel Guitar," Vol. 27PN, ca. 1943.

[20] The author's collection, while incomplete, contains no reference to Hawaiian music.

[21] Oahu Publishing Company, "Oahu Modern Note Method for Steel Guitar," Vol. 16PN, ca. 1948.

exchange occurred between members of the working class from both races, exemplifying what Robert Cantwell calls a "guarded intimacy between races at the lower levels of society."[22] In the hands of blues performers, however, the slide, typically worn on one finger of the left hand, provides the guitar with a differentiated voice and accompaniment texture in addition to the players singing voice. In the context of the blues, the use of the bottleneck slide provided the means to subvert the pitch script embedded in the guitar itself through the frets, which placed the instrument firmly in the service of an equal-tempered, twelve-note scale. The ambiguity between these styles can be seen in the recordings of Frank Hutchison (1897–1949).

One of the earliest recorded American players of the slide guitar, Hutchinson was born in Raleigh County, West Virginia.[23] Hutchison reportedly learned much of his repertory from an African-American musician named Bill Hunt, who came to the region seeking employment in the 1910s.[24] Prior to the Great Depression, Hutchinson sought his fortune as a performing musician, and made thirty-nine recordings for Okeh Records between 1926 and 1929.[25] He eventually abandoned professional music making for a

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[22] Cantwell recounts the interactions between the white bluegrass pioneer Bill Monroe and African-American musician Arnold Shultz, a blues guitarist who also influenced the playing of Merle Travis and Chet Atkins. Robert Cantwell, *Bluegrass Breakdown: The Making of the Old Southern Sound* (Urbana and Chicago: University of Illinois Press, 1984), 30–31, 262. The blurred lines of multiracial musical exchange are also discussed in Karl Hagstrom Miller, *Segregating Sound: Inventing Folk and Pop Music in the Age of Jim Crow* (Durham, NC: Duke University Press, 2010). As Troutman has shown, this includes itinerant Hawaiian musicians. Troutman, "Steelin' the Slide."

[23] Norm Cohen and David Cohen, *Long Steel Rail: The Railroad in American Folksong* (Champaign: University of Illinois Press, 2000), 427.

[24] Cohen and Cohen, *Long Steel Rail*, 428.

[25] Tony Russell, *Country Music Records: A Discography, 1921-1942* (Oxford: Oxford University Press, 2004), 449–50.

career as a grocer.[26] As a white musician who learned songs from an African-American, Hutchison presents an ideal subject for close analysis. A transcription of his 1926 recording of Hunt's song, "Worried Blues," provides an ideal springboard for attempting to discuss the confluence of the two steel guitar styles in one musician.[27]

Many of Hutchison's songs bear the title and formal constructions of the blues, but it is unclear whether he consistently played his steel guitar in the Hawaiian style or the blues style, as he was photographed holding the instrument in both positions.[28] His contemporary, Cliff Carlisle, also performed in a heavily blues-influenced style, but always played in the Hawaiian style. Hutchison's playing on the song, "Worried Blues" (1928) suggests the Hawaiian orientation, as there is no interplay of open strings with steel-fretted notes, and the triadic chords are moved simply up and down the neck using the same voicing. The right hand style, however, is more typical of blues playing, with a down stroke of the thumb answered by plucks of one or two fingers, and an absence of the plucked polyphonic passages. Echoes of other potential roots of the song's musical style come in the sixth verse: "She left me here, trying to sing this ragtime song."

In "Worried Blues," Hutchison's guitar technique can be broken into two main elements: the left-hand glissandi used to punctuate both chord changes and shorter segments of the irregular pulse, and the right-hand strokes, which consist of a thumb stroke on the bottom two or three strings, and a finger stroke (or strokes) on the top two melody strings. In general, the pulse is defined by the alternation of the sliding chords,

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[26] Cohen and Cohen, *Long Steel Rail*, 428.

[27] Frank Hutchison, "Worried Blues," on *Times Ain't Like They Used To Be: Early American Rural Music: Classic Recordings of the 1920s and 30s, Vol. 2*, Yazoo 2029, 1997, compact disc.

[28] Tony Russell, *Country Music Originals: The Legends and the Lost* (Oxford: Oxford University Press, 2007), 60–61.

which provide a downbeat and the thumb stroke, which provides accented off-beats. The glissandi are different in character than those of Hawaiian-influenced players, who use them to approach and move between notes. In blues-influenced playing such as Hutchison's, the motion is generally more important than the destination. The overall rhythmic pattern of the song matches what Kubik describes as "asymmetrical time-line patterns," which he considers one of the most significant African elements of the early blues style.[29] The question of whether this feature is deliberately or even consciously retained by Hutchison is raised by the reception of Hutchison's own playing by a contemporary white musician. In an interview with Mike Seeger, Sherman Lawson, a fiddler who performed with Hutchison in 1928, associated Hutchison's timing to a lack of "any real musical knowledge."[30]

Another key figure in the incorporation of slide guitar into early country music is Jimmie Davis, who, despite a later career as the segregationist governor of Louisiana in the 1960s, was at the forefront of cross-cultural musical hybridity in the late 1920s.[31] Davis's recordings for Victor from 1929–33 even featured several African-American musicians, including slide guitarist Oscar Woods. While Davis is best known for penning the enormously popular "You Are My Sunshine," these early recordings are particularly "risqué" examples of the country blues style popularized by Jimmie Rodgers and Cliff Carlisle. Davis's evocation of multiple styles can be seen in two recordings that make use of contrasting slide guitar styles.

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[29] Gerhard Kubik, *Africa and the Blues* (Jackson: University Press of Mississippi, 1999), 53–56.

[30] Tony Russell, ed., "Hutch: Sherman Lawson Interview," *Old Time Music* 11 (Winter 1973): 7.

[31] Malone and Neal, *Country Music, U.S.A.*, 107–08.

Davis's self-representation as a blues singer can be heard in his 1930 recording of "She's a Hum Dum Dinger (From Dingersville)."[32] In this song, Davis's singing is doubled by Woods's slide guitar, which serves to de-emphasize the singer's clear delivery through a tonally fluid interpretation of the same melody. The pervading smeared approach to the pitches demonstrates the archetypical sound of the blues slide guitar. Woods's assured playing on a solo break reflects the influence of early jazz and ragtime on the bottleneck tradition. This recording's representation of the blues is contrasted in a recording from 1932, "I'll Get Mine By and By," on which a markedly more Hawaiian-influenced slide guitar player provides the accompaniment for Davis.[33] While this player (credited as Jack Davis) brings out some of the smeared "blue" notes of blues playing, the predominantly polyphonic texture and use of the "tinkling" right hand articulation, combined with the track's Carter Family-style backing vocals, place this song plainly on the "folk" side of the early country sound.

The conflation of the blues slide and Hawaiian steel guitar styles that characterizes the instrument's use in the 1920s and 1930s can be heard in the recordings of such professional musicians as Cliff Carlisle and Jimmie Tarlton, as well as semi-professionals such as the Johnson Brothers and the Dixon Brothers. The Johnson Brothers made over two dozen recordings between 1927 and 1930, including seven tracks

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[32] Jimmie Davis (with Oscar Woods), "She's a Hum Dum Dinger (From Dingersville)," *Texas Slide Guitars: Oscar Woods & Black Ace, Complete Recorded Works 1930–1938*, Document Records, DOCD-5143, ca. 2005.

[33] Jimmie Davis, "I'll Get Mine By and By," *Victor-Bluebird Masters*, Jimmie Davis in the John Edwards Memorial Collection, FT-3250, Southern Folklife Collection, University of North Carolina at Chapel Hill.

at the legendary 1927 sessions orchestrated by Ralph Peer in Bristol, Tennessee.[34] In the song "A Passing Policeman," for example, Paul Johnson accompanies his own voice with a unison steel guitar melody. Any connection to the style's Hawaiian-language roots is at least partially severed as the instrument matches the contours of Johnson's dialect and extremely nasal delivery.

Dorsey and Howard Dixon honed their musical skills while working in textile mills in Darlington and East Rockingham, South Carolina. Howard began playing the Hawaiian guitar in 1931, when Jimmie Tarlton was briefly employed as a coworker. Tarlton, who had already recorded for Columbia records between 1927 and 1930, had a tremendous impact on their style, influencing Howard to take up the Hawaiian guitar and Dorsey to adopt a fingerstyle guitar technique for his accompaniments. On songs such as "Rambling Gambler" (1936), Howard plays what would become the standard introduction and turnarounds—instrumental statements of the melody before and between verses—that are heard in the typical country song of the 1940s. Howard plays a predominantly single-string melody which alludes to the blues as much as to the idea of "Hawaii." Though the Dixons never achieved commercial success, their recordings are not only important documents of the duet genre, but also show the steel guitar's penetration into the full scope of early country.

Perhaps the most historically significant performer who incorporated the novel Hawaiian sounds and themes into his music was Jimmie Rodgers. Rodgers, whose

[34] Charles K. Wolfe, "The Bristol Sessions: The Cast of Characters," in *The Bristol Sessions: Writings about the Big Bang of Country Music*, ed. Charles K. Wolfe and Ted Olsen, (Jefferson, NC: McFarland & Co., 2005), 45–47.

recordings are central to the canon of country music, featured Hawaiian guitar in many of his songs.[35] In these recordings, the steel guitar, played sometimes by Hawaiian musicians and sometimes by studio musicians, is usually heard in a loose unison with the melody, shadowing Rodgers's voice. On other recordings, the steel guitar is used in what would become the predominant model for many hit songs of the later 1930s and the 1940s: in the introduction it plays a brief statement of the song's hook, in the verse it plays a chordal accompaniment figure, and it joins Rodgers's voice for a yodel in the refrain.[36]

On Rodgers's 1929 recording of "Everybody Does It in Hawaii," co-written with his sister-in-law Elsie McWilliams, he is accompanied by the Hawaiian steel guitar of Joe Kaipo.[37] The steel guitars provide a frame for the song's lyrics of the song, which paint a picture of a nubile, available, and willing native girl who is simply waiting to be brought home from the island like a souvenir: "I picked me out a hula-hula girl before my boat could land / … Now when I leave Hawaii when I leave ole Waikiki / I'm goin' to take my hula hula girl and bring her back with me / 'Cause everybody does it in Hawaii.

While invoking the sound aesthetic of Hawaiian music in conjunction with the lyrical imagery, the arrangement of this particular recording is typical of other "early

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[35] Of 114 original recordings in the boxed set *Jimmie Rodgers: The Singing Brakeman*, twenty-nine feature the steel guitar (the vast majority of the total being only Rodgers with his guitar). Jimmie Rodgers, *The Singing Brakeman*, Bear Family Records BCD 15540, 1992.

[36] As Jocelyn Neal points out, Rodgers recorded with a variety of different ensembles, from Hawaiian groups to jazz trumpeter Louis Armstrong to the Carter Family, in an effort to reach as many record buyers as possible. Jocelyn Neal, *The Songs of Jimmie Rodgers: A Legacy in Country Music* (Bloomington: Indiana University Press, 2009), 11.

[37] Jimmie Rodgers, "Everybody Does It In Hawaii," Victor 22143, 1929. For more on the recoding of this song, see Johnny Bond, *The Recordings of Jimmie Rodgers: An Annotated Discography* (Los Angeles: John Edwards Memorial Foundation, 1978), 11; and Nolan Porterfield, *Jimmie Rodgers: The Life and Times of America's Blue Yodeler* (Urbana and Chicago: University of Illinois Press, 1992), 206–210

country" recordings, and foreshadows its role in later country performances. The song begins with Kaipo playing a brief statement of the song's hook ("Everybody does it in Hawaii"). Throughout the remainder of the song, the steel guitar shadows Rodgers's vocals, playing harmonies in a loose rhythmic unison. Kaipo provides a chordal accompaniment figure in the verse, and joins Rodgers's voice for a yodel in the refrain.

Although Rodgers provides one of the highest profile uses of the Hawaiian guitar in early country music, by the time of his first recordings at the infamous "Bristol Sessions" in 1927, the instrument had already entered the broader musical landscape of the United States. Performers such as Frank Ferera, Joseph Kekuku, and George Awai not only made recordings, but also toured the country in traveling exhibitions where they were heard by fellow musicians such as Jimmie Tarlton and Pete "Brother Oswald" Kirby, who learned the Hawaiian style to compete for musical work in their own regions.[38]

These recordings demonstrate the steel guitar's separation from the musical and cultural contexts of its origins. An ontological shift also occurred, as the use of the generic term "steel guitar" increased, the term "Hawaiian guitar" also came to refer more to the combination of the slide technique and its orientation on the player's lap than to any specific melodic, harmonic, and phrase style of Hawaiian music. (The standard guitar was distinguish as the "Spanish" guitar, in reference to its European heritage.) That is not to say that the Hawaiian tradition was completely abandoned, but rather that the steel guitar gained a degree of independence from its origins. Although the Hawaiian repertory remained in the consciousness of players and listeners, the instrument gained new

[38] Malone and Neal, *Country Music U.S.A.*, 104, 128.

associations through its use in the context of parlor music, jazz, country, and other genres of popular music. The emergence of a distinctly "American" steel guitar style is evidenced by a statement in the introduction of a method book published on the other side of the globe in Australia, in which the author emphasizes that his instructions are for "the Hawaiian method and not the American style of playing the steel guitar."[39]

"Steel Guitar Progress": New Mechanical and Musical Scripts, 1935–1950

Along with these departures from the cultural and musical origins of the Hawaiian style, the late 1920s and 1930s saw the physical form of the steel evolve beyond its origins as a modification to the standard guitar. The new technologies of the 1930s and 1940s brought new techniques and sonorities that heralded the birth of a new tradition—one that became indelibly linked to country music, and paved the way for the development of the pedal steel. These developments included the increased volume afforded by the invention of the resonator guitar and the introduction of electrical amplification, the latter of which led to a redefinition of the instrument's form and significantly altered its musical character. The electric lap steel guitar fostered the introduction of new and expanded tunings, the success of which propelled the development of both multi-neck instruments and novel mechanical means for rapid changes in tuning. At the same time, amplification also allowed the redefinition of the country music ensemble, spurring the development of the honky tonk style and setting the stage for the emergence of the pedal steel.

[39] Leon Coleman, *The Easy to Learn Steel Guitar Method* (Melbourne, Australia: Allan & Co. Pty. Ltd., 1937), 2.

The Resonator Guitar

The earliest technological advancements that aligned with the steel guitar tradition in the United States came with the advent of the resonator guitar in the 1920s.[40] Developed by George Beauchamp and John Dopyera, these instruments were an attempt to acoustically increase the volume of the instrument in order to allow guitarists (of both Spanish and steel configurations) to better compete with other instruments and the ambient noise of many performance situations. These instruments gained volume and projection by adding one or more aluminum resonators to their bodies.[41] Often referred to by the brand name Dobro, these resonator guitars proved popular among players of the steel guitar, and were a key element of the emerging genre of country music.

One of the foremost factors in the establishment of the emergent sound of traditional country music was the programming of music on the Grand Ole Opry. From its inception as the *WSM Barn Dance* in 1925, the Grand Ole Opry was a crucial inroad for old-time and country music's presence in American popular culture.[42] By the mid-1940s, when NBC began broadcasting the Opry nationally, the program set the standard for mainstream country music. While allowing for emerging artists and a degree of musical innovation, the Opry's main focus was the presentation of wholesome, traditional

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[40] A short history of the resonator guitar, from its invention to the early twenty-first century is found in Peter T. Veru, "The National-Dobro Guitar Company: How the Resonator Guitar Survived the Age of Electrical Amplification," M.A. thesis, George Washington University, 2009. See also Bob Brozman, ed., *The History and Artistry of National Resonator Instruments* (Fullerton, CA: Centerstream Publications, 1993).

[41] Patents for these designs include John Dopyera, *Stringed Musical Instrument*, U.S. Patent 1,741,453, 9 April 1927 (13 December 1929); and George D. Beauchamp, *Stringed Musical Instrument*, U.S. Patent 1,808,756, 11 March 1929 (9 June 1931). N.B.: Since designs typically exist at the time of a patent application, I base my chronology on dates of application, providing the date each patent is granted in parentheses.

[42] For a history of WSM, and its impact on country music (as well as other genres), see Havighurst, *Air Castle of the South*; see also Malone and Neal, *Country Music U.S.A.*, 70–75.

music. Among the longest-standing acts in Opry history was Roy Acuff, who only achieved success after adopting what Richard Peterson terms the "hard-core" sound in 1938–39, with a band designed to "*seem like*…a 'traditional' string band."[43] Though not actually a significant part of the string band tradition, the steel guitar was an integral part of Acuff's instrumentation. The steel guitar, in particular the resophonic guitar that came to be known as the dobro (after its manufacturers the Doperya Brothers), was played first by Clell "Cousin Jody" Summey and then by Beecher "Bashful Brother Oswald" Kirby, who was a mainstay of Acuff's group until the 1950s.[44] Though cast as a country rube among an already artificially rustic ensemble, these players were able to show off their abilities in dazzling instrumental showcases such as "Steel Guitar Chimes," which highlighted the harmonics that would become a staple of country steel guitar.[45]

The resonator guitar also found a place in bluegrass, most notably in the hands of Burkett "Buck" Graves, known on stage as "Uncle Josh." In 1955, Graves joined Flatt and Scruggs after playing dobro for Wilma Lee and Stoney Cooper, who were among the few acts to retain the "traditional" sound, like that popularized by Acuff, into the 1950s.[46] As Graves recounts, Flatt and Scruggs were interested in incorporating the dobro, which had previously not been played in bluegrass, in order to further distance their sound from that of their former employer, bluegrass pioneer Bill Monroe.[47] Incorporating the three-

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[43] Richard A. Peterson, *Creating Country Music: Fabricating Authenticity* (Chicago and London: The University of Chicago Press, 1997), 146.

[44] Malone and Neal, *Country Music U.S.A.*, 127–28.

[45] Roy Acuff, "Steel Guitar Chimes" (featuring Clell Summey), Columbia 70752, 1937.

[46] Malone and Neal, *Country Music U.S.A.*, 223, 334.

[47] Josh Graves, *Bluegrass Bluesman: A Memoir*, ed. Fred Bartenstein (Urbana, Chicago, and Springfield: University of Illinois Press, 2012), 23.

finger picking style of Scrugg's banjo to the mix of Hawaiian and blues tropes that formed the basis of the dobro's technique, Graves forged a novel style that remains a popular feature of many modern bluegrass bands.

Electrical Amplification

The most significant shift in steel guitar technology came in the early 1930s with the introduction of electrical amplification, which offered an increased volume far beyond that of resonator guitars.[48] One of the pioneers of the amplified acoustic steel guitar, and amplified guitar in general, was Texan Bob Dunn.[49] Performing with Western Swing pioneer Milton Brown in 1936, Dunn utilized the slightly overdriven sound of the amplified guitar to play frenetic single line melodies, adding the vocabulary of jazz to the instrument's musical script. A trombonist by training, Dunn treated the steel guitar more like a horn than an accompanying instrument. Dunn's conception of the steel guitar as solo instrument anticipated the role of the electric guitar and electric steel guitar in country music, jazz, and other popular music of the next several decades.

The proliferation of electrical amplification led to a morphological transformation of the steel guitar (and soon after the Spanish guitar). The fundamental physical difference between the electric instrument and its forebear was the reduction of its

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[48] The exact origin of the amplified guitar is a highly contested subject. The earliest efforts in this direction date to the late nineteenth century. See Matthew Hill, "George Breed and his Electrified Guitar of 1890," *Galpin Society Journal* 61 (April 2008): 193–203.

[49] For a biography of Dunn, see Kevin Coffey, "Steel Colossus: The Bob Dunn Story," in *The Country Reader: Twenty-five Years of the Country Music Journal*, ed. Paul Kingsbury (Nashville: The Country Music Foundation and Vanderbilt University Press, 1996), 90–109. See also Cary Ginell, *Milton Brown and the Founding of Western Swing* (Urbana and Chicago: University of Illinois Press, 1994), esp. 108–113. For more on the steel guitar in Western Swing, see Jean A. Boyd, *The Jazz of the Southwest: An Oral History of Western Swing* (Austin: University of Texas Press, 1998), 113–42.

physical form to a simple, often one-piece body. Now able to sidestep the acoustical demands of the traditional guitar, the lap steel's sound was produced solely by the interaction of its strings and the electric pickups. The new, wholly electric steel guitars provided the same cutting volume without the harsh tones of the amplified acoustic guitar.

The reception of this increasingly technologized instrument paralleled the emphasis in American society on the new and improved. The preface to one of Roy Smeck's later instruction manuals praises the virtues of the electric steel guitar, proclaiming that "Continual improvements are being made in the materials and design of both the guitar and the amplifier so that what is now produced in tone by a good instrument with good amplification is a far cry from the 'stringy' tone of the original unamplified wooden guitar."[50] A later instruction book went as far as to equate the acoustic Hawaiian guitar to the then obsolete Ford model T.[51]

The inherent nature of amplification also presented the opportunity for new musical effects. The denaturalization of the plucked string by both the bar and the electrical amplification gave the electric steel guitar a focused and sustained sound that brought it closer than ever to the human voice. [52] The creative use of volume control gave the steel guitar one of its most famous devices: expressive vocal quality useful both for ballads and for the "crying" effect that became a steel guitar cliché. The anthropomorphic

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[50] Roy Smeck, *Radio City Album for Hawaiian Electric Steel Guitar*, compiled and edited by Harry Reser (New York: Edward B. Marks Music Corporation, 1953), 2.

[51] Daisy Murmann Stryker, *Hawaiian Guitar, E7th Tuning, Natural Pitch* (New York: Daisy Murmann Stryker, 1955), 3.

[52] In a 1937 instruction book by Rey, the lap steel is identified as "the electric singing guitar." Alvino Rey, *Modern Guitar Method: Hawaiian Style* (New York: Robbins Music Corporation, 1937), 7.

antics of players who used the volume control for "vocal" techniques (e.g., imitations of sobbing and moaning) tied the electrified lap steel somewhat ironically back to the rustic, particularly as it was employed by country comedians, who were frequently cast in the role of the hillbilly rube.[53] Similar effects were used as a novel element by virtuosos such as the jazz bandleader and lap steel player, Alvino Rey, who was famous for demonstrating the full range of the instrument's possibilities, and would prove an important proponent of the earliest pedal steel guitars.

Aside from these overtly "novel" techniques, the possibilities afforded by amplification also impacted the core musical practices of the steel guitar. In particular, the electric steel's clarity of tone lent itself extremely well to three- and four-note chords, particularly in the upper register. The use of these chords necessitated a shoring up of intonation, and the abandonment of the fluid intonation of the bottleneck style in favor of fuller harmonies.

In addition to these timbral changes and their effects on the steel guitar's musical practices, the simplification of the electric steel guitar's body paved the way for a new visual aesthetic and new forms. The visual aspect included designs ranging from the starkly functional form of the Rickenbacker Frying Pan to the Art Deco-influenced design of National's "New Yorker" model. The simplicity of its construction also led to the addition of strings beyond the normal compass of six, and the subsequent development of new and extended tunings. The experiments in the realm of tunings propelled the instrument into new musical territories, and fueled the further development of its form.

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[53] For an example, see Clell Summey's performance as "Cousin Jody" on Lonzo and Oscar, "Why Should I Cry Over You," on the Grand Ole Opry television show, http://www.youtube.com/watch?v=0ETsRsE6_AA

New Tunings and an Expanded Compass

Tunings are an integral part of the script of any instrument, but particularly for the steel guitar, as the bar ensures that the open tuning is directly carried throughout the instrument's range. In this way the different tunings of the steel guitar are often treated as distinct instruments—individual species within a common genus. As essentially a new instrument, the lap steel became the site for experimentation on tunings. The use of multiple tunings dates back to the original Hawaiian steel guitar repertory, and a major benefit of the lap steel design was the low cost and relatively easy use of instruments with more than one neck. A double-neck instrument could still be played in the lap, but it was also possible to support with legs, which were used to prop up the instrument both for a standing and a sitting playing position. With legs, it was now possible to add a third or fourth neck, granting players unprecedented ease of access to multiple tunings, and driving the development of new tunings and techniques.

At the forefront of these explorations was Jerry Byrd (1920-2005), a native of Lima, Ohio who came to be known as the "master of touch and tone." Byrd began playing steel after hearing a group of Hawaiian musicians who were part of a touring tent show.[54] Though he seeped himself in recordings of the Hawaiian style, he turned to playing country music in the 1930s because of more opportunities for employment. He eventually joined the Renfro Valley Barn Dance, which led to recordings with Ernest Tubb and Red Foley. As he continued to explore new styles, he departed from the open G major, A major, and E major tunings of the Hawaiian players to create tunings based on

[54] Byrd discusses his innovations in both his autobiography, *It Was a Trip: On the Wings of Music* (Anaheim Hills, CA: Centerstream Publishing, 2003); and in an extensive interview in Andy Volk, ed., *Lap Steel Guitar* (Anaheim Hills, CA: Centerstream Publishing, 2003), 27–35.

extended triads and seventh chords, multiple triads, and even the diatonic scale. He is particularly noted for popularizing the C6 tuning, of which he developed an eight-string version in the mid 1930s, and remains at the heart of jazz and swing steel guitar styles. A chart of the various tunings used by Byrd and others in the 1930s and 1940s shows the ways in which they remain closely related—they are often achieved by retuning the strings a half- or whole-step—and harmonically interconnected, while at the same time enabling entirely different melodic and harmonic gestures (see Figure 1-1).

String	1	2	3	4	5	6	7	8
A major (high bass)	E4	C#4	A3	E3	C#3	A2		
A major (low bass)	E4	C#4	A3	E3	A2	E2		
E major	E4	B3	G#3	E3	B2	E2		
E7	E4	B3	G#3	E3	D3	E2		
C# minor 7	E4	C#4	G#3	E3	B2	E2		
C6	E4	C4	A3	G3	E3	C3		
B11	E4	C#4	A3	F#3	D#3	C#3	B2	
C diatonic	E4	C4	B3	A3	G3	F3	E3	
E9	E4	B3	G#3	F#3	E3	D3	B2	E2
C6/A7	E4	C4	A3	G3	E3	C#3	C3	A1
F# minor 9	E4	C#4	G#3	E3	A2	F#2	C#2	G#1

Figure 1-1. Electric Lap Steel Tunings, ca. 1945.

The particular characteristics of each steel guitar tuning not only made them suitable for different styles and repertory, but also guided the composition of music by its players. The connection between the steel guitar's tuning (and thus the intervals under the bar) and composition demonstrates the height of idiomatic writing—compositions that not just "fit" an instrument, but are *about* the instrument, showcasing its strengths and techniques. The correlation of tuning and composition is epitomized in one of the "greatest hits" of the steel guitar repertoire: Leon McAuliffe's 1936 composition "Steel Guitar Rag."

Born in Houston, Texas, in 1917, McAuliffe joined Bob Wills's Texas Playboys (one of the most popular Western swing bands of the time) at the age of eighteen.[55] As part of his audition, he played a piece that he had written while experimenting with the six-string E major tuning seen in Figure 1-1. McAuliffe was hired, and the band added his tune to their repertory, where it became a popular request. They recorded it the next year, with Wills introducing the track with what would become a catchphrase in live performances: "Kick it off, Leon."[56]

Written unsurprisingly in the key of E major, "Steel Guitar Rag" begins with a single-string melodic pickup on the upper two strings of the E major tuning, connected by the C# stopped with the bar at the second fret of the B string (see Figure 1-2a). On the downbeat, McAuliffe displays one of the most characteristic gestures of the steel guitar, bending in and out of the "blue" flatted third. This gesture is repeated twice, followed by a third iteration that ends the A section of the tune with a descending and then ascending E major arpeggio with the added sixth. Following a B section centered on the subdominant A major chord, McAuliffe leaps to the twelfth fret for a C section (Figure 1-2b), in which he slides into an arpeggiated E major triad, which is transposed to B major and then A major, showcasing both the action of the bar and the transposition of the intervals of the open tuning across the neck. As simple as this melody is, it perfectly showcases the essential characteristics of the steel guitar, as well as the specific sonorities of the E major tuning.

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[55] Volk, *Lap Steel Guitar*, 94–101.

[56] Bob Wills and His Texas Playboys, "Steel Guitar Rag" (featuring Leon McAuliffe), Columbia C1479, 1936.

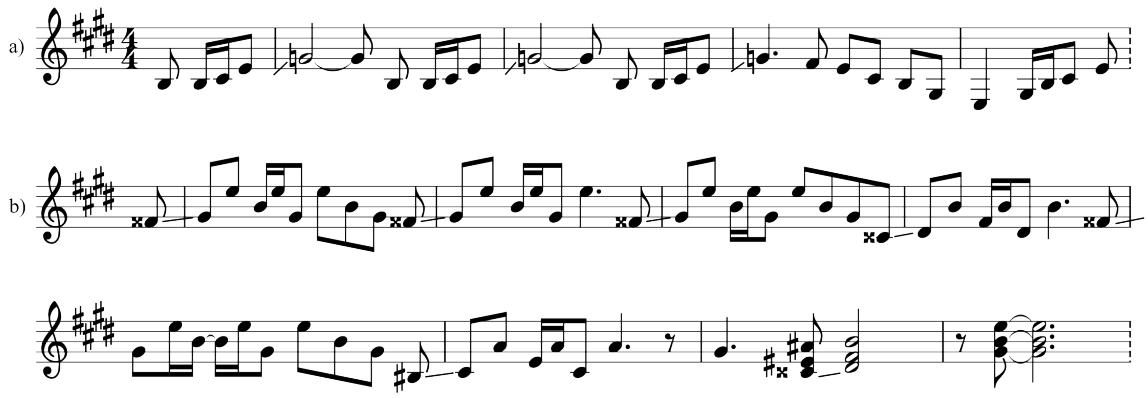

Figure 1-2. Bob Wills and his Texas Playboys, "Steel Guitar Rag" (1936), beginning of A section [0:07–0:17] (a) and C section [0:45–1:01] (b).

As each tuning lent itself to different gestures and melodic features, most steel guitarists had several preferred tunings that they would use for different songs in their repertory. To access the different tunings, players had several options: they could have multiple instruments, they could retune their instrument for a given song or set of songs, or, beginning in the late 1930s, they could use a multi-neck instrument setup with several alternate tunings. From as early as 1916, however, American inventors sought to design mechanisms to facilitate the use of multiple tunings on a single neck.[57] The simplicity of the lap steel's basic design opened the door for an onslaught of technical experimentation that paved the way for the development of the pedal steel guitar. The lack of acoustic constraints to the lap steel's design led to a number of successful tuning changers, some of which integrated into commercially available instruments. Each of these inventions was imbued with the intentions of its inventor—a script for the technology's use that drove its design.

[57] The full gamut of these inventions is documented in Miller, "Origins and Development," 61–81.

Early Pitch-changing Devices

One of the earliest documented attempts to provide mechanical means to alter the pitch of a Hawaiian-style guitar is seen in a patent applied for in 1916 by Edwin David Wilber of Detroit, Michigan.[58] This design was a follow-up to a 1914 patent in which Wilbur and a co-patentee foreshadowed the multi-neck lap steels of the 1930s with a seventeen-string acoustic guitar whose compass is divided into a minor chord (E, G, B, E, G), a diminished chord (G, B-flat, C-sharp, E, G), and a major chord with a dominant seventh (G, F, D, G, B, D, G).[59] This "new and Improved Stringed Musical Instrument" was intended to "enable the beginner to learn to play the instrument in a comparatively short time." By placing a steel (called a "movable finger" in the patent, with no reference to the Hawaiian style) on the appropriate set of strings at the appropriate fret, the player could simply strum with the right hand to produce any chord desired.[60]

The again "improved" 1916 instrument is also a guitar played on the lap, but with only seven strings. Again foreshadowing future designs, the strings are anchored not to the bridge or a tailpiece, but to individual levers that extend from an axle inside the body through slots in the top of the soundboard (see Figure 1-3). A series of buttons, one for each string, is installed on the soundboard, near where a modern pickguard would be located. When one of these buttons is depressed, it activates a lever arm, which pivots on a second axle, causing its end to press on the string lever, stretching the string and raising

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[58] Edwin David Wilbur, *Stringed Musical Instrument*, United States Patent 1,259,062, 1 June 1916 (12 March 1918).

[59] Nathaniel Richard Boswell and Edwin David Wilbur, *Stringed Musical Instrument*, United States Patent 1,168,153, 23 September 1914 (11 January 1916).

[60] The invention's relationship to the Hawaiian style is explicitly stated in Wilbur, U.S. Patent 1,259,062.

the pitch. Like that of the pedal steel, the system is balanced with a spring, and is tuned using a screw that extends through the end of the body. Between the tuning screw and adjustments to the button, each string can be raised any amount from a half step to one and a half steps. The major practical problem with Wilbur's design is the need for the player to hold down the buttons with the right hand while playing.

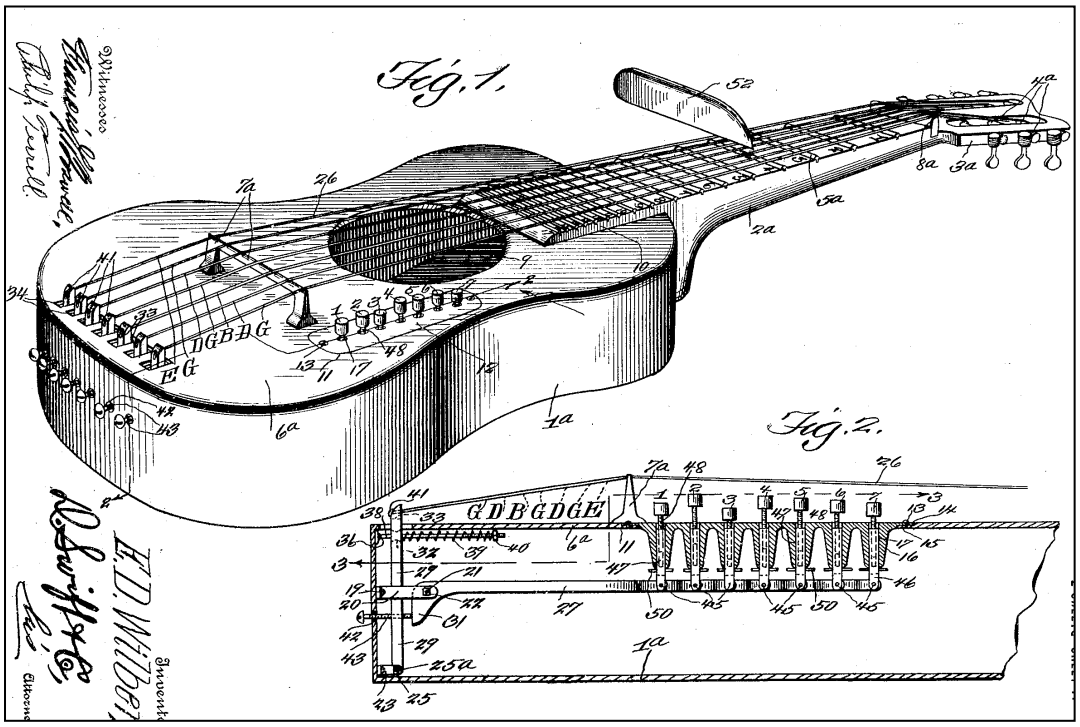

Figure 1-3. Detail from patent drawing, Edwin David Wilbur, patent no. 1,259,062, 1 June 1916.

Following this outlying design, the late 1920s and early 1930s brought several other designs that sought to add pitch-changing functionality to acoustic guitars. One device, created by two brothers from South Dakota, attached to the headstock of a standard acoustic guitar that provided a two-way lever to switch between not just two tunings (ostensibly an A major and an E major tuning) but between a Spanish guitar setup

and a Hawaiian guitar setup with a raised nut.[61] A different tack is taken by a system invented by Arthur Harmon of Illinois, who designed a complex of mechanisms that added two knee levers to an acoustic lap steel guitar.[62] Designed to work with the A major tuning, one knee lever lowered the upper C# string to C-natural for a minor triad, and the other raised the A-string to B-flat (A#) for a diminished triad. This design was facilitated by the "square-neck" construction of acoustic guitars dedicated to the Hawaiian style.

As discussed above, however, the change to the solid wood bodies of lap steel guitars facilitated a change in inventors' approaches to the problem of pitch-changing mechanisms, and a boom in patent designs between 1940 and 1953. These designs included models manufactured for sale by large companies such as Epiphone and National-Valco. The functionality of these devices ranges from the built-in three-tuning selector switch of National's Triplex to the individually adjustable strings of the Epiphone Varichord.[63] The three-way selector seen in the Triplex, which capitalized on the close relationships of the A major, E major, and C# minor 7 tuning seen in Figure 1-1, also appeared as a separate attachment that could be added to a lap steel either by a

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[61] John T. Kaufman and Chris Kaufman, *Stringed Musical Instrument,* United States Patent 1,809,710, 13 July 1928 (9 June 1931).

[62] Arthur R. Harmon, *Musical Instrument*, United States Patent 1,924,854, 25 November 1932 (29 August 1933).

[63] The Triplex is patented in John B. Cousineau, *Stringed Musical Instrument,* United States Patent 2,519,824, 29 April 1949 (22 August 1950). The Varichord is patented in Dominick A. Maffei and Clyde C. Doerr, *Stringed Musical Instrument,* United States Patent 2,234,718, 22 September 1939 (18 March 1941). Both instruments are photographed in George Gruhn and Walter Carter, *Electric Guitars and Basses: A Photographic History* (San Francisco: Miller Freeman Books, 1994), 17, 36.

manufacturer or a player.[64] These devices were available on the instruments of Paul Bigsby, whose steel guitars factor heavily into the history of the pedal steel, and their function aligned with the pedal steel's initial mechanical script, which sought to achieve similar chord changes with the actions of the players feet rather than a hand-operated device (see Figure 1-3).[65]

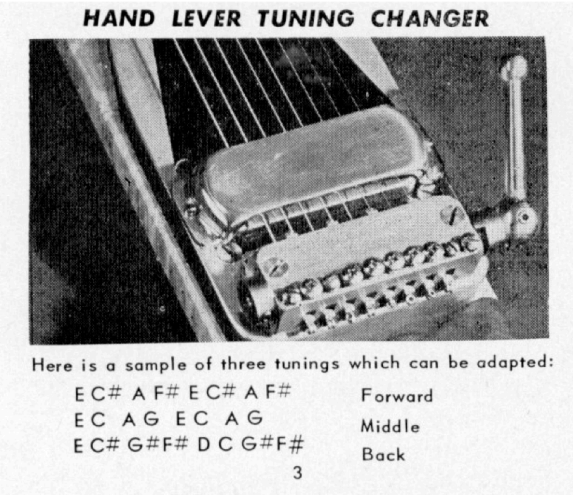

Figure 1-3. Three-way chord changer by Herbert Hise. Detail from Bigsby Electric Guitars, *The Finest Professional Steel Guitars* (Downey, CA: Bigsby Electric Guitars, 1963), collection of the author.

Conclusion: The Rise of the "Crying Steel Guitar"

The establishment of the electric steel guitar sound as an essential element of the American musical soundscape was the result of a transformation of the Hawaiian steel guitar that reflected both the practical concerns and the aesthetic values of musicians, music industry figures, and audiences. Both the changes in playing styles and

[64] Herbert M. Hise, *Stringed Musical Instrument*, United States Patent 2,641,15215 July 1949 (9 June 1953).

[65] Bigsby Electric Guitars, *The Finest Professional Steel Guitars* (Downey, CA: Bigsby Electric Guitars, 1963), 3.

advancements in technology combined to foster not only the separation of the instrument from its Hawaiian origins, but also linked it to the popular music of the mainland United States. Although forms of the steel guitar found a place in urban parlor music, jazz, Western Swing, and other genres, perhaps the most significant aspect of its dissemination was its adoption into the mainstream of the emerging genre of country music.

A leading role for the electric steel guitar was secured in the bands of singers such as Ernest Tubb and Eddy Arnold, where its amplified sound was able to cut through the din of the honky-tonk nightlife. The jazz-oriented C6 tuning that dominated the instrument in the 1940s brought an extended chordal vocabulary to the typical three-chord structure of country songwriting. Its mechanical refinements drove musical exploration, and created distinctive effects that were popular with audiences. Following the practice established by Jimmie Rodgers and other early country artists, the steel guitar was the first sound heard on many hit recordings. These include some of the most formative repertory of the country genre: the songs of Hank Williams. The enduring popularity and iconic status of Williams's recordings, bolstered by the singer's tragic demise, created a prototype for one of the predominant strains of the country sound. As country historian Joli Jenson puts it, "The pain that permeates the honky-tonk genre is condensed, I think, in the sound of the steel…[It] offers the wail of love and loss that men are too stoic to express directly, that they try to drown in beer and whiskey, that they live with and cannot leave behind."[66]

[66] Jenson, *The Nashville Sound*, 33.

CHAPTER TWO

SCRIPTING THE PEDAL STEEL, 1950–1975

Technological objects are rarely born of a single mind, moment, or milieu. Rather, they evolve through a combination of invention (the purposeful search for new technology), innovation (the reassessment, repurposing, and refinement of existing technology), and emergence (the amorphous and often serendipitous appearance of new ideas without intention). As demonstrated in Chapter One's discussion of the history of the lap steel guitar, the confluence of these processes can be understood through the framework of technological scripts: patterns of use that are attached to devices either explicitly, through manuals or instructional materials, or implicitly, through precedent or common practice. In the case of musical instruments, these scripts can relate to the mechanical operations enabled by their design, the musical sounds and gestures they are used to produce, and/or the cultural conventions that inform their use and meaning. Scripts do not predetermine how an instrument is made, played, or heard. In some cases they exert a powerful influence, highlighting an instrument as a conduit for transmitting fixed ideas through time and space; in other cases, the individual agency of a single user can trump the embedded patterns, sometimes irrevocably shifting the trajectory of existing ideas and attitudes.

In this chapter, I examine the establishment of the pedal steel guitar's modern form in the period 1950–75. This period saw the advent of the technologies and

techniques at the heart of the instrument's hallmark sounds. The technologies consist of the system of linkages and levers that allow the pitch of the instrument's strings to be temporarily raised or lowered, either individually or in groups, by the feet and knees of the player. The techniques developed in several directions: an expanded palette of diatonic harmonies, the ability to move between harmonies with little articulation or break in sound, and an increased fluidity of scalar melodies.

Whereas the steel guitar tradition as a whole reflects a technological idea with historical and global precedents, the pedal steel guitar emerged as both a new technological solution to specific musical problems posed by the musical contexts of the mid-century United States and a vehicle for previously unheard musical figures and gestures. Its evolution was the result of the interplay among mechanical, musical, and cultural scripts that were provided, performed, and propagated by inventors, players, and a variety of cultural gatekeepers. As such, the pedal steel demonstrates the give-and-take among disparate ideas and acts of individual agency that are embodied in technological objects.

The narrative of technological development begins with the process of design—the exploration of potential and possibilities. The scripts that are developed by inventors and designers are often different from those important to other types of users.[1] An inventor is often involved in a speculative process, not only searching for new ways to accomplish mechanical tasks, but also for new things that can be done. The pedal steel's formative mechanical scripts are most clearly represented through the more than thirty

[1] It is important to note, however, that the lines between the different categories of users are often blurred: many inventors are also players to some degree, and some players are active participants in the process of design.

patents issued between 1938 and 1976, which document not only the function of the relevant mechanisms, but also the stated intentions of their inventors. The concepts distilled in the patents, however, provide only part of the story, as the actual use of instruments in the hands of their players demonstrates the sometimes conflicting approaches that musicians and inventors applied to the problems and potentialities of technology.[2] This clash of theory and praxis is readily seen in the narrative portions of patents, some of which show a clear engagement with actual tunings and practices, while others offer more of an abstract idea of things that could be done with strings, levers, and knobs.

The mechanisms provided by inventors were then explored, refined, or rejected by individual steel guitarists, who were guided to varying degrees by their knowledge of music theory and conventions, the tuning(s) and repertory they were taught, and the demands of other musicians or their audience. The musical evolution that followed can be traced through recordings, and are documented in this chapter through a chronological series of transcriptions of tracks recorded between 1947 and 1975. Although the pedal steel's mechanisms began as a way to facilitate tuning changes, players in the 1950s used them in new ways that generated the instrument's unique sound aesthetic. At the heart of this transformation was the combination of the tone achieved with the steel bar with an increased capacity for diatonic harmonies, scalar melodies, and contrapuntal gestures, particularly the juxtaposition of static pitches with the fluid portamento associated with other slide guitar styles.

[2] Additionally, these patents do not account for every influential design; some of the most significant makers of the 1950s and 1960s did not patent their creations. The study of these patents does, however, provide a unique vantage point to the process of technological development.

The dialogue between pedal steel players and instrument makers did not occur in a vacuum, but within the context of the cultural scripts of the commercial country music industry. As such, the use of the pedal steel was guided by the tastes of audiences, or more accurately, the interpretation of those tastes by record executives, producers, and artists, as well as by critics and tastemakers outside of the chain of production. The initial development of the modern pedal steel was driven, in fact, by its appearance on hit records such as Webb Pierce's 1954 single, "Slowly." In some periods, notably the late 1950s and early 1960s, the ebb and flow of stylistic trends led to the pedal steel's absence on many recordings. However, this period saw a marked expansion of the instrument's capabilities and a steady refinement of its mechanisms, which led its players to seek out venues to explore alternative musical scripts. By the late 1960s, the pedal steel's status as an unmistakable marker of country music was confirmed by its adoption into the burgeoning genre of country rock, where new musical ideas were introduced by both country-based players and new players who came from outside of the instrument's formative milieu. These new uses contributed to the emergence of a loosely canonized body of aesthetics and repertory that defined the country pedal steel's sonic and cultural identity.

Early Inventions and Patents

As discussed in Chapter One, the electric steel guitar's acoustically neutral form proved ideal for experimentation on tuning mechanisms. Capitalizing on the manipulability of the lap steel's form, players and inventors in the 1930s and 1940s had been attempting to create mechanisms that would allow for an easy change between

different popular tuning systems. As the use of the bar generally limited the available pitches at a given fret to the intervals of the open strings, these changes needed to be accomplished by means other than altering the sounding string length. The shift towards multi-neck steel guitars mounted on legs facilitated the introduction of foot pedals as a convenient interface with a wide variety of devices that were designed to affect the tension of the strings. Most of these designs reflected their inventor's specific ideas about the practical realization of the potential of their devices—the most literal incarnation of a mechanical script. The rhetoric used by inventors in the prose descriptions of patent applications explicitly addresses many of the most important concerns of designers: the benefits of the new invention, the potential contexts of its use, and the practical concerns that may limit its application.[3]

The eleven patent applications relating to pedal-operated steel guitars submitted between 1936 and 1950 present three main goals. The first is to facilitate access to multiple steel guitar tunings, expanding from those based on major triads to ones based on minor and diminished triads, triads with added sixths (popular in Western swing styles), as well as extended tertian structures such as 7th, 9th, 11th, and 13th chords (reflecting the more complex chords required for playing other types of jazz, as well as songs in the Tin Pan Alley style).[4] The second goal is to generate new and different musical figures, albeit of an unspecified nature. Such rhetoric speaks to a general drive towards technological innovation for its own sake, and parallels the technological utopianism evident in the publications of Eddie Alkire discussed in Chapter One. The

[3] A more detailed analysis of the mechanisms themselves is found in Miller, "Origins and Development," 82–99.

[4] The tunings are generally referred to by the chord that they spell (e.g., A6, E11, C#m7).

final goal is the creation of instruments that are "easy" to play—that is, those that use technology to obviate the need for advanced technique.

The earliest documentation of an electric lap steel with pedal devices is a patent applied for in 1936 by Antony P. Freeman of San Francisco. Granted to Freeman in 1938, U.S. patent no. 2,122,396 shows a lap steel in the style of Rickenbacker's famous "frying pan" model mounted on a stand and operated by two pedals (see Fig. 2-1).[5]

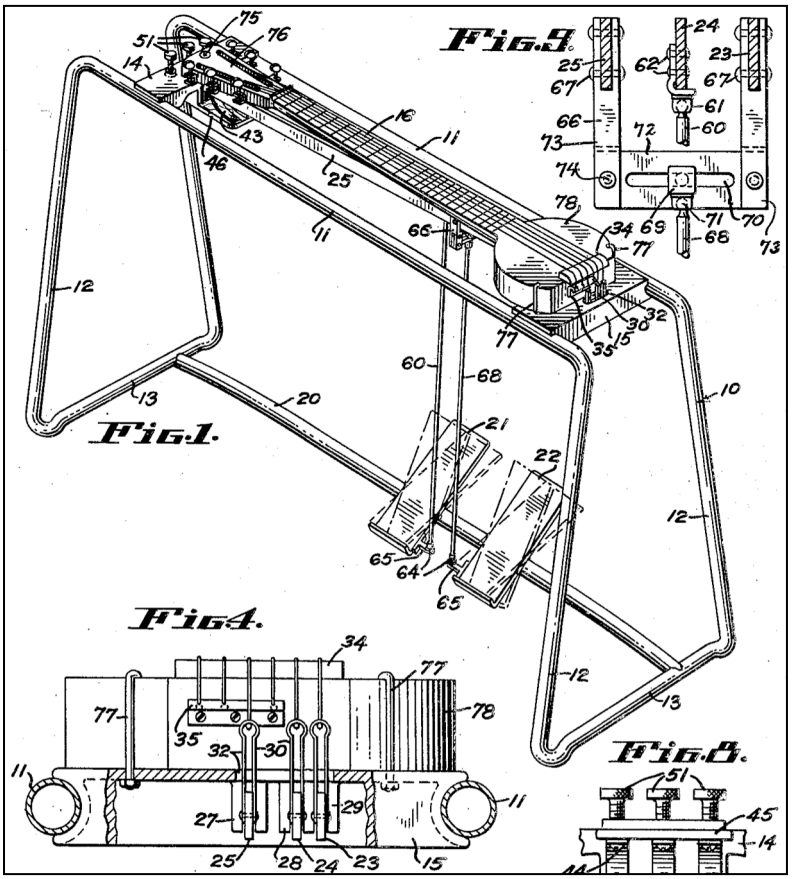

Figure 2-1. Detail from Antony P. Freeman, *Musical Instrument*, U.S. Patent 2,122,396 (14 December 1936).

[5] Antony P. Freeman, inventor, *Musical Instrument,* U.S. Patent 2,122,396, 14 December 1936 (5 July 1938).

A device built into the end of the stand provides a separate anchor for three of the six strings; the rest are attached to the bridge as normal. The three affected strings are still stopped by the bridge, but their tension is adjusted by pressing the pedals. Three different pedal positions, which Freeman calls "neutral, toe, and heel," provide three different pitches for each affected string. The result, as Freeman claims, is that "the utility of the [Hawaiian] guitar in modern arrangement and orchestrations is immeasurably increased," as the instrument is "capable of supplementing the instruments of an orchestra to produce unheard of tonal effects."

Although no evidence exists of a surviving example, the patent states that two prototypes were played by "outstanding guitarists." It is reasonable to speculate that the input of these players influenced the somewhat circumscribed possibilities afforded by Freeman's design. The number of pedals is kept at two, as "the provision of more than two treadles would render a mechanism of this character unduly complex and extremely difficult to operate under the changing conditions of music of almost any sort." Likewise, the variability of the mechanisms is limited to half steps, which are claimed to grant "the greatest practical range of useful tunings for a minimum expenditure of physical and mental effort on the part of the performer." The limits of other essential materials are also accounted for with the acknowledgement that strings "either break or stretch too much upon being raised, or if lowered much farther they do not reliably return to their normal pitch."

The Gibson Electraharp and the Harlin Multi-Kord

Although Freeman's patent does not indicate the source of his inspiration, he may have been exposed to another San Francisco-based musician, lap steel player and jazz bandleader Alvino Rey. Born Alvin Henry McBurney on 1 July 1908 in Oakland, California, Rey began his musical career playing ukulele and banjo, and focused his efforts on the guitar after seeing a 1928 performance by Andre Segovia.[6] He soon adopted a steel guitar style based on an E7 tuning, with which he sought to emulate the sound of a full big band horn section, using three-, four-, and five-note chords in close voicings.[7] He began playing an electric lap steel in 1931, and in 1935, he was recruited to develop a lap steel for Gibson.[8] During this design process, Rey adopted the use of a stand and a series of pedals that allowed him to play a wider variety of chords and voicings.[9] In 1940, Rey met machinist John Moore, with whom he collaborated on the first of several pedal steel designs that Gibson produced under the name Electraharp.

Submitted in August 1940, Moore's patent detailed an eight-stringed instrument "wherein with six pedals no less than fifteen chords may be obtained [at each fret]…the key of said chords being varied in the conventional manner with the steel or bar."[10] These

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[6]Per Rey's recollections in 1990, quoted in Fred Hall, *More Dialogues in Swing: Intimate Conversations with the Stars of the Big Band Era* (Ventura, CA: Pathfinder Publishing, 1991), 88.

[7]Ibid., 89.

[8] Per Rey's recollections in 1993, quoted in Ruymar, *The Hawaiian Steel Guitar and its Great Hawaiian Musicians*, 144.

[9] Ibid.

[10] John J. Moore, *Stringed Musical Instrument,* U.S. Patent 2,234,874, 23 Aug 1940 (11 Mar 1941).

chords are obtained by means of a pitch changing mechanism (a "changer") that allows each of the pedals to increase or decrease the tension on any of the strings.[11]

The patent specifies the use of a D7 tuning, likely due to the extra strain that the pitch changes, and provides a chart detailing the suggested configuration of the changer, which could actually be set up to raise or lower any string with any pedal (see Fig. 2-2). Although some of the fifteen chords are quite logical (D7, G9, Dmaj7, D aug, Bmin7), others are more esoteric (including the eight-note chord Db–A–F#–D–B–Ab–Eb–D, and an enharmonically spelled minor-major seventh chord Db–A–F–D).

	Strings							
	1st	2nd	3rd	4th	5th	6th	7th	8th
Open	D	A	F#	D	C	A	F#	D
#17 pedal	D	A	F	D	B	G	F	D
#18 pedal	D♭	A	F#	D	B	A♭	E♭	D
#19 pedal	D	A#	F#	D	A#	Not used	F#	D
#20 pedal	D	A	F	D	C	A	F	D
#21 pedal	B	A	F#	D	B	A	F#	D
#21⅔ down	C	A	F#	D	C	A	F#	D
#21⅓ down	D♭	A	F#	D	Not used	A	F#	D
#22 pedal	D#	A	F#	D♭	B	A	F#	D♭
#17 and #18 pedals	D♭	A	F	D	Not used	Not used	Not used	Not used
#19 and #20 pedals	D	A#	F#	D	A#	A♭	F#	D
#20 and #21⅔ down	C	A	F	D	C	A	F	D
#20 and #21 pedals	B	A	F	D	B	A	F	D
#21⅔ down and #22	C	A	F#	D#	Not used	A	F#	D#
#21 and #22 pedals	B	A	F#	D#	B	A	F#	D#

Figure 2-2. Detail from John J. Moore, *Stringed Musical Instrument,* U.S. Patent 2,234,874 (23 August 1940).

Consisting of a substantial body constructed from bird's-eye maple and walnut, the first Electraharp model was only produced from around 1939 to 1942, when Gibson's

[11] An example of this instrument can be viewed at the National Music Museum website, http://orgs.usd.edu/nmm/PluckedStrings/Guitars/Gibson/5918/Electraharp.html.

production facilities were diverted to the war effort.[12] Although the mechanism of the production models is based on Moore's patent, the body of the instrument more closely resembles that seen in a second design patented on behalf of Gibson around the same time. This patent expressed a musical aim—to "permit the playing of numerous types of chords making chord progressions complete without objectionably increasing the number of strings"—as well as a concern for the visual aesthetic, calling for the mechanisms to be "built into a console or cabinet to provide a highly attractive and readily played instrument."[13] In 1949, a post-war Electraharp, the EH-630, went into production with a simpler design and a more succinct ambition of making a wide variety of pitch changes."[14]

Another early pedal steel with a similar concept to the Electraharp was the Multi-Kord, manufactured in Indianapolis by the Harlin Brothers. The first of two patents held by the company was applied for in July 1947.[15] Like the Electraharp, the Multi-Kord's design was centered on the pursuit of a variety of chords, and featured a cluster of pedals on one side of the instrument's body (see Fig. 2-3).

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[12] The Electraharp appears in a ca. 1942 Gibson catalog with a price of $477. Gibson, Inc., Catalog AA (Kalamazoo, MI: Gibson, Inc., ca. 1942). According to Gibson historian Walter Carter, only thirteen instruments of this model were ever sold. Gruhn and Carter, *Electric Guitars and Basses*, 27.

[13] Neil B. Abrams and William J. Mills (assignors to Gibson, Inc.), *Musical Instrument*, United States Patent 2,257,995, 21 October 1940 (7 October 1941).

[14] William N. Gaut, *Pitch Changing Mechanism for Stringed Musical Instruments,* United States Patent 2,573,963, 7 July 1949 (6 November 1951); Gruhn and Carter, *Electric Guitars*, 28

[15] J.D. Harlin, *String Musical Instrument with Chord Tuning Mechanism,* United States Patent 2,458,263, 21 August 1947 (4 January 1949). Their second patent is essentially a renewal of the first, twenty years later. J.D. Harlin, *Chord Tuning Mechanism for a String Musical Instrument,* United States Patent 3,404,595, 17 January 1966 (8 October 1968).

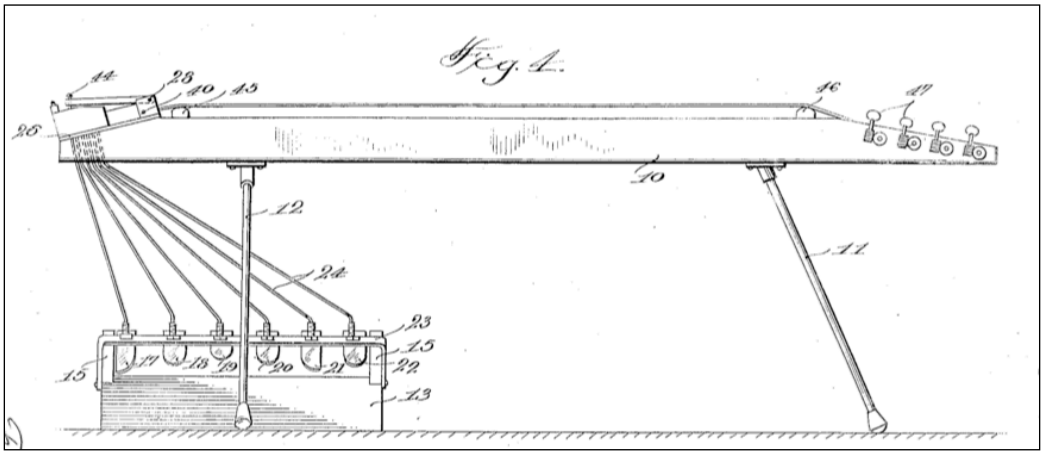

Figure 2-3. Detail from John J. Moore, *Stringed Musical Instrument,* U.S. Patent 2,234,874 (23 August 1940).

In contrast to the expansive chordal vocabulary afforded by the original Electraharp patent (prompted by Alvino Rey's virtuosic playing), Harlin intended "a stringed instrument on which one or more or several chords can be played without resort to difficult fingering operations…thus making it possible for players of having only rudimentary skill to give performances comparable to the performances of players of much greater experience and accomplishment."[16] This alternate purpose is connected in the other side of Harlin's business pursuits, a large school for teaching Hawaiian-style steel guitar.[17]

In contrast to the largely practical concerns suggested by the Gibson and Harlin patents, two 1947 designs from Californian Newton J. Adair show a more speculative approach. Adair expresses a desire to increase the overall potential of the steel guitar, which he feels is "limited in [its] musical expression by an inability to achieve many

[16] Ibid. This is a similar idea to that of the autoharp, perhaps indicating a link between that instrument and the naming of the Electraharp.

[17] Ruymar, *Hawaiian Steel Guitar*, 143.

chords, chordal variations, and chordal progressions requisite to the rendition of musical concepts and effects desired. These limitations inhibit the musician in his performance and restrict the composer in his development of theme, mood, ornamentation and variation."[18] Adair's practical impulses are shown in other dimensions of the design, including visual appeal, ease of use (beyond playing), and imagined production costs: "Another object is to provide a console stringed instrument…that is attractive in appearance and convenient to play…conveniently and easily dismantled for carrying and reassembled without displacing the precision tuning thereof from adjustment…simple in structure, economical to manufacture, and efficacious in operation."[19]

A major difference between these early designs, which is seen throughout the history or the pedal steel's early development, is the means by which the pitch of the strings is altered. The Gibson and Harlin designs each revolve around a changer system in which the mechanisms serve as one of the fixed points of the strings. Each string's mechanisms consist of three segments: an anchor for the string and two "arms." These parts are joined so that when one arm is activated, the anchor pivots away from the sounding length of the string, increasing the tension and raising the pitch. When the other arm is activated, the anchor pivots in the opposite direction, easing the tension and lowering the pitch. Springs are used to ensure that the parts return to their original positions when not activated. The major advantage to this design is that the changes in string tension are achieved by stretching the string uniformly along its length, in a similar manner to its normal tuning. Adair's invention, on the other hand, employs a series of

[18] Newton J. Adair, *Musical Instrument*, United States Patent 2,459,102, 25 January 1947 (11 January 1949).

[19] Ibid.

hooks that use the descending motion of the foot pedals to pull the strings downward at a point outside of their sounding length. Although this method requires fewer specialized parts (which, as they needed to be metal in order to withstand the tensions involved, would in turn require machining skills and tools), the application of a second direction of tension by pulling the strings resulted in a less tuning-stable system.

The dominant mechanical script of the early pedal-equipped steel guitars, in which pedals acted as a means to access additional chords and tunings, was carried forward into the late 1940s, when the events leading up to the genesis of the modern pedal steel were set into motion. It began with a triple-neck, non-pedal console steel made in 1946–47 by Paul Bigsby (1899–1968), a machinist and motorcycle factory foreman, for his friend Earl "Joaquin" Murphy, a major player in the Los Angeles Western swing scene.[20] Bigsby soon shifted to a full-time career as a luthier after an electric guitar he made for another friend, singer and guitarist Merle Travis, became an instant icon. In 1948, he was approached by Wesley "Speedy" West, an up-and-coming steel guitarist, who commissioned him to create an instrument inspired by one played by a musician named Eddie Martin. Martin had installed an existing lap steel in a large cabinet, a "wild looking monstrosity" with flashing lights in addition to pedals. Per West's recollections, neither he nor Bigsby was aware of any earlier pedal steel designs.[21] Building on the design of Murphy's console steel, Bigsby and West agreed upon an

[20] For more details on Bigsby and his instruments (although focused heavily on instruments other than his steel guitars), see Andy Babiuk, *The Story of Paul Bigsby Father of the Modern Electric Solidbody Guitar* (Savannah, GA: FG Publishing, 2008).

[21] Speedy West, interview by Douglas B. Green, 18 November 1974, interview OHC193-LC, transcript, Country Music Foundation Oral History Project, Country Music Hall of Fame and Museum, Nashville, TN. See also Rich Kienzle, *Southwest Shuffle: Pioneers of Honky-Tonk, Western Swing, and Country-Jazz* (New York: Routledge, 2003), 193–220.

instrument with three necks and four pedals, each of which raised the pitch of one or two strings.[22]

Bigsby's first pedal steel established many of the practical and visual features of the modern pedal steel. To begin with, the body of the instrument was made from highly figured bird's-eye maple and cast aluminum parts, including the sides of the body (which the legs screwed into), the bridge, and a one-piece keyhead that incorporated the nut and the tuning machines. The three necks are staggered in height, and each neck has a raised fretboard. The pedals are arrayed in a row along the front of the instrument instead of in the corner, but still concentrated on the player's left, as a volume pedal operated by the right foot was standard gear for steel players at that time (see Fig 2-4). The mechanisms designed by Bigsby echoed the hooks used by Adair (and West's description of Martin's instrument), but refined them into more substantial plungers with built-in screws for tuning.

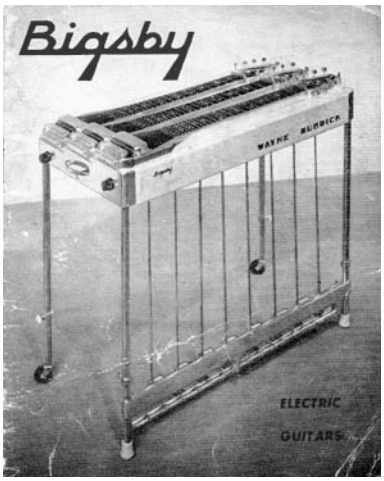

Figure 2-4. Detail from cover of Bigsby Electric Guitars, *The Finest Professional Steel Guitars* (Downey, CA: Bigsby Electric Guitars, 1963), collection of the author.

[22] The exact setup of West's steel is not reliably documented, and its mechanisms were severely altered at some point. It was recently re-discovered in a California collection and is on display in the Country Music Hall of Fame in Nashville.

After West received his Bigsby in February 1948, he incorporated the pedals into an arsenal of techniques and special effects that included both musical and electronic tricks. Using them exclusively to alter his tunings between chords, West masked his use of the pedals visually with a panel attached to the front of his steel and sonically by using right-hand technique and the application of a volume pedal to render the changes inaudible. As musicians figured out how West was achieving his unprecedented variety of harmonies, Bigsby received a barrage of orders for new instruments, including a double-neck pedal steel that was delivered to Nashville player Bud Isaacs in 1952. Unbeknownst to Bigsby, this instrument would be at the center of a paradigm shift that set the future course of the pedal steel.

User Intervention: Pushing Pedals

Born on 26 March 1928, in Bedford, Indiana, Forrest "Bud" Isaacs learned to play the steel guitar in the Hawaiian style, but quickly adopted the extended tunings and techniques of Western swing and country music.[23] After dropping out of high school, Isaacs pursued performance opportunities in Texas and Michigan before he was invited to join the band of Little Jimmy Dickens, who brought him to Nashville in 1949. He proceeded to tour with artists such as George Morgan, Cowboy Copas, and Red Foley, for whom he was working in 1952, and who provided the $350 for his Bigsby pedal steel.[24]

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[23] Bud Isaacs and Geri Mapes, interview by John W. Rumble, 9 May 1989, interview OHC63, transcript, Country Music Foundation Oral History Project, Country Music Hall of Fame and Museum, Nashville, TN.

[24] Liner notes, Bud Isaacs, *Bud's Bounce*, Bear Family Records BCD 16798, 2006.

Isaacs's Bigsby was a double-neck model with two pedals. The front neck (which Isaacs used almost exclusively) was tuned to an E9 chord, and its two pedals followed the existing idea of providing access to the closely related A chord. Since Bigsby's mechanisms were not designed to operate on large groups of strings, the tuning shift was divided between the two pedals, with one operating the upper strings, and one affecting the lower strings (See Fig 2-5).

String	1	2	3	4	5	6	7	8
Pitch	**E4**	**B3**	**G#3**	**F#3**	**D3**	**B2**	**G#2**	**E2**
Pedal 1		+C#4	+A3					
Pedal 2					+E3	+C#3	+A2	

Figure 2-5. Bud Isaacs's tuning and pedal setup, ca. 1953.

Isaacs began experimenting with the melodic possibilities of the pedals, aiming to imitate the sound of two fiddles playing in harmony.[25] At the November 1953 session for "Slowly," Isaacs was ready to put this technique on display when asked by producer Owen Bradley to provide an introduction. Following the track's release in January 1954, "Slowly" reached number one on the Billboard country music charts, and exposed Isaacs's playing to players and listeners alike.[26]

Isaacs's performance on "Slowly" is centered on a brief but distinctive musical gesture that represents a dramatic shift from a style emphasizing parallel chromatic slides to one combining the shimmering tone of the steel bar with a smooth, diatonic chord change including a sustained common tone. To illustrate the nature of this change, Figure

[25] Ibid.

[26] Joel Whitburn, *Top Country Singles, 1944 to 2001* (Menomonee Falls, WI: Record Research, 2002), 146.

2-6 shows the (non-pedal) steel guitar introduction to Hank Williams's 1952 song, "Your Cheatin' Heart," alongside parts of Williams's vocal melody.[27] On this recording, Don Helms invokes the contour of Williams's vocals on the tag line, "your cheatin' heart / will tell on you," but recasts the melody with chromatic slides into the dominant and tonic triads. In doing so, he transforms the F-sharp in the third measure of the phrase from a note of inflection (its short vowel renders it less accented, and it is very sharp) to a more strongly accented dissonant event, highlighting the parallel chromatic harmony between that beat and its subsequent resolution.

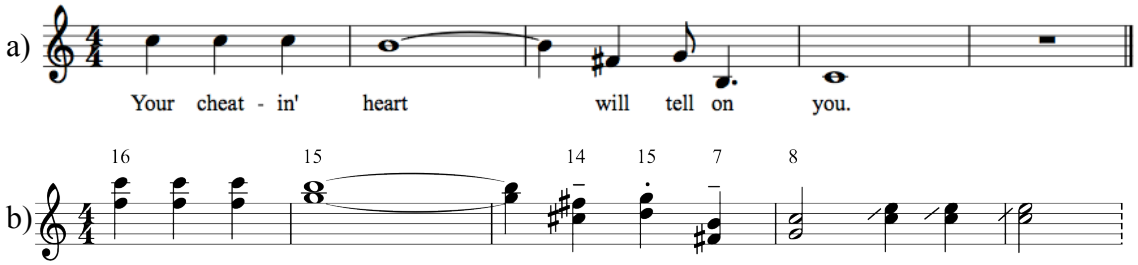

Figure 2-6. Hank Williams, "Your Cheatin' Heart" (rec. 1952), vocal melody [0:29–0:36] (a), and steel guitar intro by Don Helms [0:00–0:08] (b).

The distinctive sound of the "Slowly" introduction is created by Isaacs's use of his first pedal, which allowed him to oscillate between a first inversion triad and the root position triad of the chord with its fundamental a fourth higher, while retaining the common tone on the top. In this case, the result is a very quick I-IV-I-V-I progression (see Figure 2-7).[28]

[27] Hank Williams, "Your Cheatin' Heart," [label info to come], 1952.

[28] Examples 2-1 and 2-2 introduce some of the most important notational conventions that will be used for pedal steel transcriptions: numbers above the staff indicate the fret position, and notes that are altered from the nominal pitch at that fret by the pedals or knee levers are rendered with alternate note heads (an upwards-facing triangle for raised pitches; a downward-facing triangle for lowered pitches, with the device used indicated below the staff. A slur indicates an unbroken sound, typically including audible

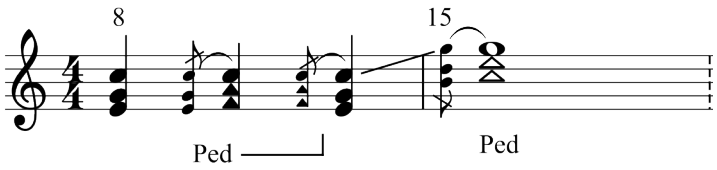

Figure 2-7. Webb Pierce, "Slowly" (rec. 1953), pedal steel intro by Bud Isaacs [0:00–0:04].

Unlike the playing of early players of pedal-equipped instruments, such as Alvino Rey and Speedy West, the changes effected by Isaacs's pedals are clearly audible, and the unequal motion of the pitches suggests a three-part counterpoint rather than a simple chord change.[29] The chromatic parallelism of the earlier style heard in Helms's playing is supplanted by diatonic voice leading that would not be out of place in art music. The physical and musical closeness of each note in the half-step cadence is supplanted by the more distributed proximity of a tonal cadence, with one note remaining the same, one note moving a half step, and one note moving a whole step.

The commercial success of "Slowly," credited at least in part to Isaacs's playing, brought the relatively niche presence of pedal steel guitars to the attention of both listeners and players, who sought both the sound and the success. Musically, Isaacs's introduction is typical of larger practices in Nashville's commercial music industry, in

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movement between pitches. Audible movement of the bar is indicated with a line. These transcriptions are not intended as prescriptive, but as a way to show the intersection of the pedal steel's mechanisms with the musical results. Where possible, I distinguish between pedal action that occurs on the beat and that which occurs before the beat.

[29] The audible retuning of strings is not without precedent, however: Earl Scruggs pioneered the technique of manually changing the pitch of his banjo strings in the course of performance, notably in the songs "Earl's Breakdown" and "Flint Hill Special," recorded in 1951 and 1952, respectively. Scruggs's use of this technique, which prompted a series of inventions designed to provide two set pitches for a given string, effectively changed his tuning from an open G chord to a D chord. A major difference between this technique and the pedal steel is that Scruggs had to use his left hand to accomplish his retuning, disrupting his normal left-hand technique and restricting his note choices to the open strings. The pitch-changing devices of the pedal steel allowed players to build new technique on top of the old. For Scruggs's account of his retuning technique, see Earl Scruggs, *Earl Scruggs and the 5-string Banjo*, revised and expanded edition (Milwaukee, WI: Hal Leonard Corporation, 2005 [1968]), 19–20.

which instrumentalists competed to create hooks, riffs, and licks that would enhance the salability of singles and ensure their continued employment. Technologically, however, the use of the pedals for a melodic gesture went against the script ostensibly provided by the maker of his instrument, in which the pedals provided a global tuning change as an alternative to retuning the instrument between songs. This subversion of the instrument's design initiated a technological call-and-response, in which the search for new and unique musical gestures was combined with the development and refinement of the mechanisms that enabled them. Unlike earlier means of spreading instrumental innovations—one-on-one instruction or written treatises, for example—the documentation of this technological exploration on sound recording fostered an immediacy of transmission that has few, if any precedents.

Following the trend set by "Slowly," the most important developments of the pedal steel were transmitted from player to player through their presence on records, highlighting the importance of cultural forces beyond the makers and players. This can be seen in the aftermath of "Slowly," as Pierce, recognizing the importance of the pedal steel to the success of his single, attempted to draft Isaacs into his touring band.[30] Failing that, Pierce instead acquired his own Bigsby pedal steel, hiring other players to reproduce Isaacs's sound in live performances as well as subsequent singles such as 1954's "More and More," which features a fairly blatant attempt to recreate the "magic" of "Slowly."

Back to the Drawing Board: Redesigned by Popular Demand

In the months and years following the release of "Slowly," players and instrument makers worked to recreate the success of both Bigsby's instruments and Isaacs's musical

[30] Isaacs, liner notes to *Bud's Bounce*.

innovation. This pursuit prompted both the establishment of new companies dedicated to pedal steel manufacture and the renewed exploration of its designs by larger companies such as Gibson, Epiphone, and Fender. The three-year wait for a Bigsby, in addition to its substantial cost, led to a somewhat mythic explosion of jury-rigged pedal systems and set the stage for the much more securely documented growth of a cottage industry of instrument modification.

One builder who sought to fill the gap in demand was Chuck Wright, who made his first pedal steel in 1948 after seeing a performance by Speedy West.[31] Wright's first instruments were very similar in design to Bigsby's, with substantial bodies made of bird's-eye maple and polished aluminum hardware. An early customer was Jimmy Day, a Nashville player who would play an important role in the pedal steel's development in the following decades. Wright also notably made an instrument for Barbara Mandrell (a steel guitar virtuoso herself) and founded the Sierra Steel Guitar Company in Oregon, which still produces pedal steels.[32]

In Nashville, dobro player and machinist Harold "Shot" Jackson exploited his musical and industrial training to add well-built pedal mechanisms to existing console steels by makers such as Fender and Gibson. Word of Jackson's modifications spread throughout the country, and players would even ship instruments to him for retrofitting.[33] After several years of modifying instruments in his garage, Jackson recruited Buddy Emmons, an up-and-coming player who had developed a reputation for tinkering with his

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[31] Sierra Steel Guitars, "History," http://www.sierrasteels.com/history.html.

[32] The Mandrell steel can be seen at the Country Music Hall of Fame in Nashville.

[33] Personal correspondence, Wade Hargrove, 29 March 2012.

newly acquired Bigsby, to create a new pedal steel from the ground up. Their efforts were an unqualified success, and taking its name from the first three letters of each of its founders, the Sho~Bud Guitar Company was formed in 1957.[34] Like those built by Bigsby and Wright, Sho~Bud pedal steels combined thick hardwoods and cast aluminum endplates. However, while Bigsby's pitch changes were achieved by pulling on the strings behind the bridge, Sho~Bud followed the design of anchoring the strings on individual fingers that rotated on an axis, increasing the tension uniformly along the entire string for improved stability.

Back in California, Leo Fender, whose Telecasters, Stratocasters, and electric bass guitars transformed music making throughout the 1950s, set out to create his own pedal steel. Fender's 1957 patent for a "pedal guitar," based on prototypes developed in 1956, is the first patent showing a pedal steel in its recognizable modern form.[35] Although the patent was not granted until 1961, Fender was issued a design patent in 1958 for the "ornamental" design of the instrument. Carrying on the design of Gibson's 1930s console steels and those of Paul Bigsby, the instrument's two necks are offset, with the neck closest to the player slightly lower than the other. The pedals are arrayed on a short panel running between the two front legs, and are connected to the underside of the instrument by rods. One of the most distinctive features of the Fender steels is the use of cables to transfer the force of the pedals to the string changers. Fender's design also allowed for

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[34] For Emmons's recollections about Sho~Bud, see Buddy Emmons, "Buddy Emmons, Shot Jackson, and the Birth of the Sho~Bud Steel Guitar," http://www.planet.eon.net/~gsimmons/shobud/buddy.html

[35] Clarence L. Fender, "Pedal Guitar," United States Patent Des. 186,190, 20 August 1958 (22 September 1959). Richard R. Smith, *Fender: The Sound Heard Around the World* (Milwaukee, WI: Hal Leonard Corporation, 2003), 157; Forest White, *Fender: The Inside Story* (San Francisco: Miller Freeman Books, 1994), 95, 97.

the player to make rapid changes to the setup without any special tools or mechanical ability. The trade-off for this ease of operation, however, were occasional losses of cable tension, which affected the functionally of the mechanisms.[36]

Fender's initial efforts resulted in the production of two models of pedal steel. The double-necked 1000 and single-necked 400 were produced from 1957 and 1958, respectively.[37] The first large production-run pedal steels, these instruments were exhibited at trade shows throughout the world, including a show in Nashville in November 1957, where it was introduced to Nashville players including Emmons, Day, Isaacs, and Helms.[38] While the Fender steels were never fully embraced by the Nashville players, they proved popular in California, where the bright, twangy sound of the Fender pick-ups was a major part of the Bakersfield sound.

The mechanical principles that drove the design of Fender's pedal steel guitar are echoed in the majority of pedal steel designs from that point on. Whereas the early Bigsby and Sho~Bud instruments were grounded in designs that hard-wired pitch changes associated with the Hawaiian-derived open tunings, Fender's instrument refined the ideas embodied in the yoke-based designs of the Gibson and Harlin instruments. The extra linkages and levers needed by the yoke-based systems were replaced with thin stamped steel parts, but the design retained the means to raise or lower any string with

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[36] In keeping with the idea of modifying an existing instrument, Fender's design was co-opted by two patentees from Washington, who essentially converted it into a housing for a lap steel. In addition to promising "a near-infinite combination of sounds or tones" at a fraction of the cost of a "pedal electric guitar," this patent claimed Fender's expansion of the possible setups for itself. Robert Irvin Smith and Billy Jess Woodruff, *Tone Changer for Electric Steel Pedal Guitars*, U.S. patent 3,136,198, 9 June 1964 (13 October 1961).

[37] Gruhn and Carter, *Electric Guitars,* 108.

[38] White, *Fender*, 104.

any of the pedals. Fewer moving parts meant less danger of wear. Functionally, the changer's major contribution was the provision for solid, tunable stops for three different pitches—a home pitch, a raise, and a lower—using a streamlined two-piece finger for each string. The search for the combination of the stability of the older designs with the flexibility of the Fender changer was the basis of the next wave of pedal steel innovation.

Expanding the Musical Script

As the basic technology of the modern pedal steel began to spread, the major thrust of the instrument's development shifted to the exploration and expansion of its musical potential at the hands of expert players. At the forefront of these musicians was Buddy Emmons, who had received a Bigsby with Isaacs's setup in 1955 and co-founded Sho~Bud in 1957. After arriving in Nashville from his native Indiana in 1955, Emmons had rapidly risen in the ranks of session and touring players, playing for Carl Smith, Little Jimmy Dickens, and landing a job with Ernest Tubb in 1957. The first major advance in the pedal steel's musical functionality came around this time, when Emmons divided the two string-raise of Isaacs's pedal onto separate pedals, now called A and B (See Fig 2-8).

String	1	2	3	4	5	6	7	8
Pitch	**E4**	**B3**	**G#3**	**F#3**	**D3**	**B3**	**G#2**	**E2**
Pedal A		+C#4						
Pedal B			+A3					

Figure 2-8. Buddy Emmons's E9 tuning and setup, ca. 1957

Using these pedals both together and separately, Emmons and his compatriots moved farther away from the older conception of the pedals as global tuning changes, and towards musical figures based on a more complex interplay of melody and harmony.

Several of the melodic and harmonic possibilities facilitated by this split are demonstrated on Ernest Tubb's 1958 single, "Half a Mind." As shown in Figure 2-9, Emmons uses the A pedal, raising the B string a whole step, to create a new chord voicing that combines the pedal with a bar slant (m.2, beat 4). This is followed by a gesture on beats 1 and 2 of the third measure that creates the illusion of a held note against the motion created by sliding his bar back two frets. At the end of the figure, the B pedal, raising the G# string one half tone, is used to play a triad with a suspended fourth, and the two pedals are used together at the end of the phrase for a flourish that combines pedal action reminiscent of "Slowly" with multiple octaves of artificial harmonics (indicated with diamonds).

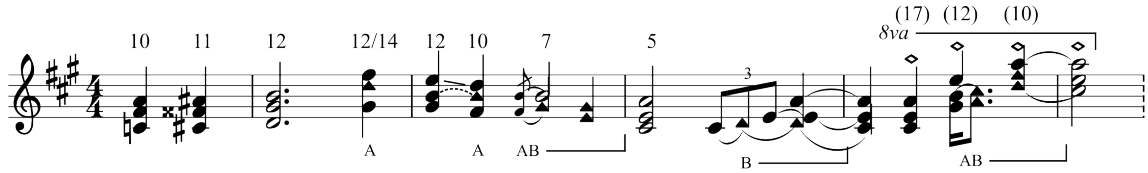

Figure 2-9. Ernest Tubb, "Half a Mind" (rec. 1958), pedal steel intro by Buddy Emmons [0:00–0:12].

A different aspect of the split pedals is showcased on Ray Price's "The Twenty-fourth Hour" (recorded in 1961), which features Jimmy Day, a friend of Emmons who had split his pedals around the same time. On this tune, a midtempo waltz, Day repeatedly plays the root position F major triad with the pedals down, but slightly delays the A pedal, creating a retardation of the third (see Figure 2-10).

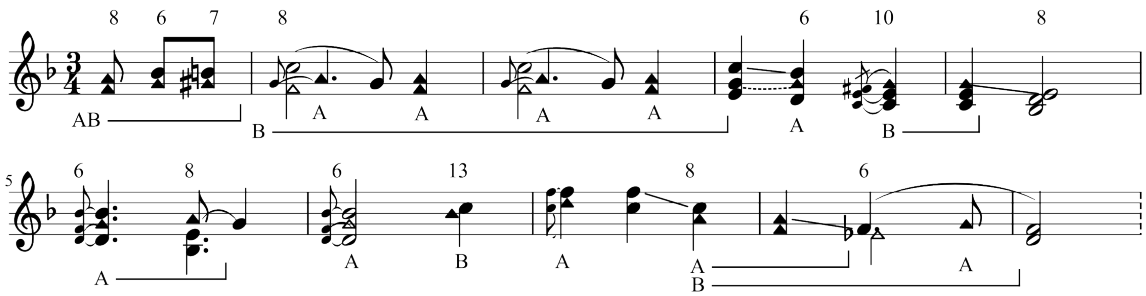

Figure 2-10. Ray Price, "The Twenty-fourth Hour" (rec. 1961), pedal steel solo by Jimmy Day [1:12–1:28].

The displaced third gesture is one of the hallmarks of the E9 pedal steel, and one in which the movement between the notes are often as important as the notes themselves. Players use a number of metaphors to describe this action—*squeezing*, *bleeding*, *milking*—that set it apart from the stomping, pushing, and mashing of fast chord changes. Although this kind of manipulation of the third is common to many guitar (and other stringed instrument) styles, either by sliding up the fingerboard or by bending the strings with the fingers, the juxtaposition of the richly inflected third with one, two, or more stable notes—particularly ones in close proximity—is distinctive to the pedal steel.[39] Note also the use of the B pedal in the penultimate measure of Ex. 2-4 to create a whole step between strings 3 and 2, serving here as the root and seventh of a dominant seventh chord.

The evolution of the E9 tuning rapidly continued at the beginning of the 1960s, incorporating ideas from west coast players such as Ralph Mooney, who had expanded

[39] Similar polyphonic gestures are, of course, readily accomplished on keyboard and mallet instruments. An example of this is pianist Floyd Cramer's "slip-note" technique, in which one note of a right-hand chord is preceded by quickly playing the note one whole step or half step below (the sound is very similar to the hammer-on technique of the guitar). Cramer famously used this gesture on his 1960 recording of the song "Last Date," copying the technique from the song's composer Don Robertson. In a later interview, Cramer also references the guitar playing of Maybelle Carter, and "lots of people on the steel guitar." Colin Escott, "Floyd Cramer," in *The Encyclopedia of Country Music: The Ultimate Guide to the Music*, ed. Paul Kingsbury, Michael McCall, and John W. Rumble (New York: Oxford University Press, 2012), 110–11.

the tuning upwards by adding a high G# string above the top E of the typical E9 tuning (see Fig 2-11).[40]

String	1	2	3	4	5	6	7	8
Pitch	**G#4**	**E4**	**B3**	**G#3**	**F#3**	**E3**	**D3**	**B2**
Pedal 1				+A3				
Pedal 2			+C#4					
Pedal 3	+A4							
Pedal 4		+F#4						
Pedal 5	-G4							

Figure 2-11. Ralph Mooney's E9 tuning and setup, ca. 1960.

Mooney's playing was featured on the recordings of Wynn Stewart and other California-based singers such as Skeets McDonald, Merle Haggard, and Buck Owens. The aesthetic of the West Coast scene, known as the "Bakersfield Sound," was centered on a bright, twangy tone and light, fast passagework.[41] Mooney switched from a homemade steel to a Fender 1000 in the early 1960s, and developed a unique technique that utilized both left and right feet, and is credited with being the first to raise the high E string to F# for melodic playing.[42] Whereas most Nashville players who added the high G# coupled it with the lower octave of that note, raising both to A with the same pedal, Mooney kept the G#-A raises on separate pedals, allowing him to play a major-minor seventh chord on the top three strings by pressing pedals 1, 2, and 5. (Mooney's setup and style will be discussed in more detail in Chapter 3.)

[40] As his setup deviates significantly from the Nashville setup, Mooney's pedals are referred to here and in Chapter Three by number rather than by letter.

[41] A collection of popular essays on the Bakersfield Sound, tied to an exhibition at the Country Music Hall of Fame is Michael Gray and John W. Rumble, eds. *The Bakersfield Sound: Buck Owens, Merle Haggard, and California Country* (Nashville, TN: Country Music Foundation Press, 2012).

[42] Bill Carter and James Sallis. "The Ralph Mooney Story," *Steel Guitarist*, no. 5 (May 1980): 22.

Back in Nashville, Emmons, who traveled to the West Coast in 1959 while on hiatus from Tubb's band, had incorporated the high G# string as well as the E to F# raise by the early 1960s. Jimmy Day is credited with moving the lowest E string to the middle of the instrument, providing the root for a close position triad in the open tuning, and a convenient fifth for the pedals-down triad. The compass of the strings was also expanded to ten and sometimes twelve strings per neck. Unlike Mooney's configuration, in which each pedal activates only one string, Nashville players such as Emmons generally coupled the multiple octaves of G#-A and B-C# changes, and paired the raise to F# on the high E string with a second B-C# raise on the adjacent string. As shown in Figure 2-12, the combination of Pedals A and B yields an A major triad on strings 1, 2, 3, 4, 6, and 8, and activating B and C together produces an F# minor triad on the top five strings and an A6 chord on the top six (see Fig. 2-10).

String	1	2	3	4	5	6	7	8	9	10
Pitch	**G#4**	**E4**	**B3**	**G#3**	**F#3**	**E3**	**D3**	**B2**	**G#**	**E2**
Pedal A			+C#4					+C#3		
Pedal B	+A4			+A3						
Pedal C		+F#4	+C#4							

Figure 2-12. Nashville E9 tuning, ca. 1960.

An example that gives an exceptionally good view of the pedal steel in this intermediate stage is a performance by Ernest Tubb and his Texas Troubadours of "Drivin' Nails in My Coffin," filmed at Nashville's WSM studios in 1961, that features a prominent solo by Buddy Emmons (see Figure 2-13).

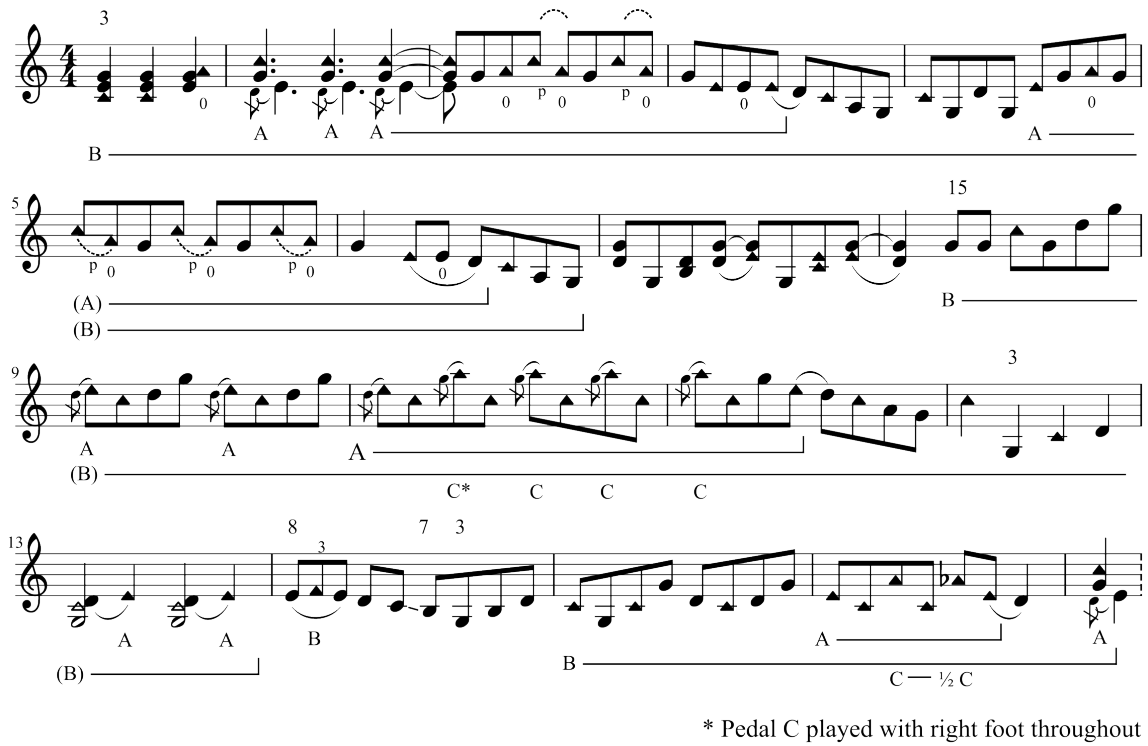

Figure 2-13. Ernest Tubb, "Drivin' Nails in My Coffin" (rec. 1961), pedal steel solo by Buddy Emmons [ca. 1:57–2:18].

This recording shows Emmons taking full advantage of the new high string, which provides a high tonic note of the pedals-down triad. In addition to an inversion of Day's "squeezed"-in third, Emmons pulls the bar off of the top strings to gain both a melodic 6th scale degree and a unison third, which he combines with the action of the A pedal for a unique effect. In the video, Emmons can also be seen twisting his hips to activate the C pedal with his right foot, raising the second string both a whole step (mm. 10–11) and the intermediate half step by pressing it halfway (m. 16).

Like Isaacs's pedal-based figure, most of the additional pedal operations both built upon established steel guitar gestures and supplanted them with a new sound aesthetic that was centered on the continuous movement between chords and chord voicings on a single group of strings. The dialogue between players and makers that was

fostered by these developments can be seen in the co-construction of the so-called F-lever by Lloyd Green and David Jackson of the Sho~Bud Guitar Company in 1967.

For many years, Lloyd Green was one of the most in-demand steel guitarists in Nashville, performing on over 10,000 recordings since 1956, including over 100 #1 singles. As part of the Nashville scene of the mid-1960s, Green was frequently in contact with other players and makers, particularly at the workshop of the Sho~Bud Guitar Company, a center of pedal steel development. Green recounts being called to Sho~Bud one day in 1967 by designer/technician David Jackson, who demonstrated a new pedal change that provided access to a voicing of the major triad between that of the open strings and the inversion found seven frets higher with the pedals down.[43] The execution of this change required significant mechanical force, and Green pointed out that the same voicing would be made possible by instead raising one string one half step in combination with one of the existing pedals. With this new change added to his own instrument as a knee lever, he soon entered the studio with singer Tammy Wynette to record her 1968 hit single, "D-I-V-O-R-C-E." Green's use of this lever caught the ear of the producer, and became the instrumental hook for the single. Musically, the lever allowed Green to oscillate between a second-inversion D major triad at the tenth fret and the same chord in root position three frets higher with the A pedal and the F lever (see Figure 2-14).

[43] Electronic correspondence, Lloyd Green to Joey Ace, 21 March 2004, http://steelguitarforum.com/ Forum5/HTML/ 007456.html

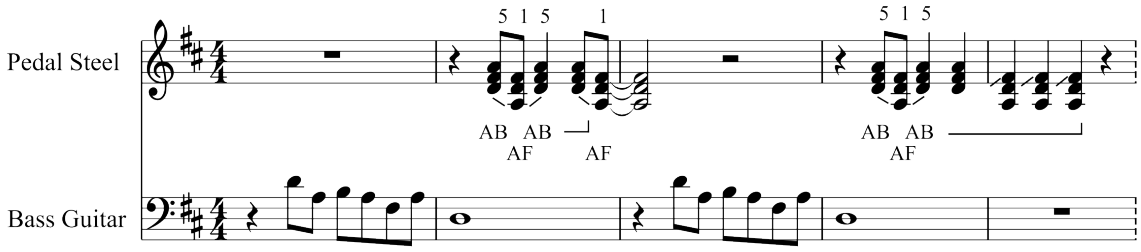

Fig 2-14. Tammy Wynette, "D-I-V-O-R-C-E" (rec. 1968), pedal steel intro by Lloyd Green [0:00–0:12].

This simple figure demonstrates the extent to which the aesthetics of Isaacs's repurposed pedals permeated the pedal steel's subsequent use. The legato connection of three-voiced chords with diatonic voice leading is one of the hallmarks of the pedal steel. The relative simplicity of Green's part actually serves to highlight the feature that he is showcasing, which is an expansion of the unequal counterpoint between I and IV (or V and I) offered by the A and B pedals. By oscillating between two inversions of the same triad on the same three strings, Green demonstrates that his setup can alter the relationships of these strings from a major third on top of a perfect fourth to a minor third on top of a major third. Although the same intervals are available one string group down, the transformation of the tuning allows for one movement of the bar be joined to unequal movement on all three strings, building on the pedal steel's dominant aesthetic of smooth legato transitions between three-note harmonic structures.

Another important facet of the pedal steel's musical script is the extension of the smoothness of its chordal voice-leading into the execution of single-line scalar melodies. A crucial development in the pursuit of the instrument's melodic capabilities came with Emmons's addition of the two reentrant strings—D# and F#—to the upper register of the instrument, expressly to fill in the melodic gaps between the open strings. Because the changes on early Sho~Bud guitars were permanently built into the body of the

instrument, Emmons first placed these strings in the ninth and tenth string position, replacing the low strings that had no changes. These strings can be heard on a 1962 track from Emmons's first recording session with Ray Price, particularly in a seven-note run about halfway through the steel guitar solo (see Figure 2-15).

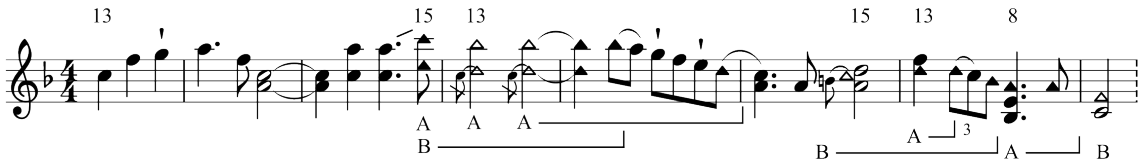

Figure 2-15. Ray Price, "You Took Her Off My Hands" (rec. 1962), pedal steel solo by Buddy Emmons [1:56–2:16]. The reentrant strings are marked with a pointer.

Although he was initially unsure about keeping these strings, they were well received by many players, and Emmons had his instrument modified so that they could be placed as strings 1 and 2. By placing these strings out of the logical sequence of high-to-low (which would have resulted in the top four strings being tuned to G#-F#-E-D#), the open chordal tuning at the heart of the steel guitar tradition was preserved, and the non-linear sequence also facilitated a variety of uniquely pedal steel techniques and gestures.

Working with the emergent knee levers, players soon lowered the new D# string to D, the dominant seventh of the open tuning. Emmons took this one step further by lowering it another half step to C#, allowing for the same unison effect with the A pedal that he achieved with the open string in mm. 3 and 6 of "Drivin' Nails in My Coffin" (Fig. 2-13). This paved the way for one of Emmons's signature gestures, a contrapuntal line spinning out of the unison between strings 2 and 5, which can be heard at the beginning of Price's 1966 song, "The Healing Hands of Time" (see Figure 2-16). The end of this example features a Bachian cadence made possible by a sophisticated use of the A pedal to create the illusion of a held note (m. 5 of the transcription).

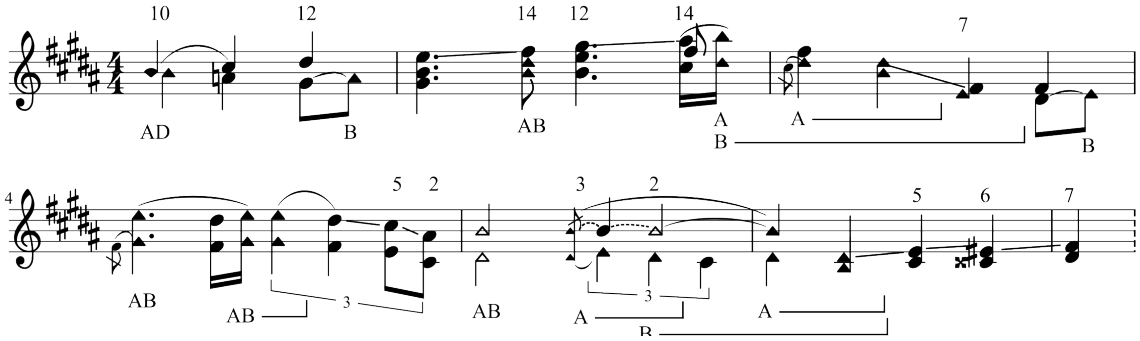

Figure 2-16. Ray Price, "The Healing Hands of Time" (rec. 1966), pedal steel intro by Buddy Emmons [0:00–0:17].

The melodic developments of the pedal steel were not all based in pop-inflected lyricism, however. Weldon Myrick's descriptively titled "Amazing One-pedal, Two-finger, three-string song" was the basis of an instructional course on *speedpicking*—a virtuosic style that employed a combination of pedal, bar, and pick techniques to produce blazingly fast and clean single-note lines (see Figure 2-17).

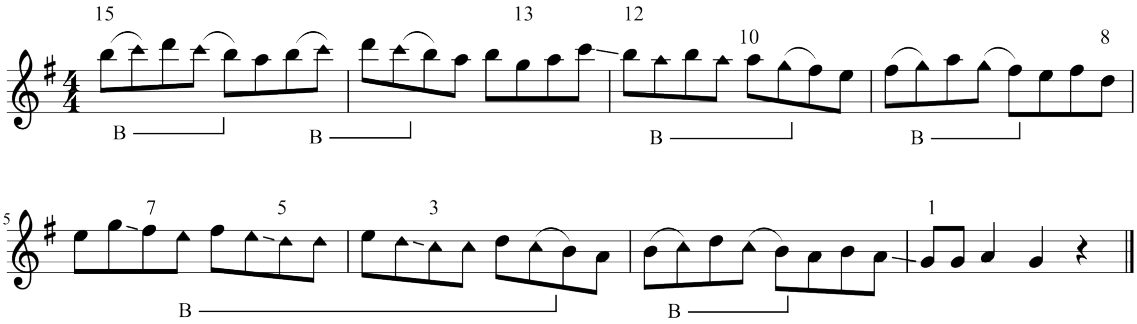

Figure 2-17. Weldon Myrick, "The Amazing One-pedal, Two-finger, Three-string Song" (rec. ca. 1970) [0:00–0:13].

The speedpicking style shows the pedal steel functioning not just as a chordal instrument, but also as a single-line solo instrument in the vein of a lead guitar or fiddle. Using the right-hand technique known as "blocking," pedal steel players muted the strings quickly

after they were struck, creating a crisply articulated style that is somewhat antithetical to the smooth legato for which the instrument was best known.

As the pedal steel's techniques and styles developed throughout the 1960s, a relatively standard pedal steel design was emerging, with two 10-string necks and 8 pedals, three affecting the E9 neck and five dedicated to the C6 neck. Players had also begun using knee levers to make additional changes, particularly on the E9 neck. The knee levers have always been the site of the most variation from player to player, and as I will discuss in Chapter 3, their configuration reflects a complex process of both musical and ergonomic decision making. Most players regard four to be the minimum number of knee levers needed to access the pedal steel's most important musical features, with one on either side of each knee, and it is now common to have a fifth lever that is activated by raising the left knee. Figure 2-18 shows a representative E9 "chromatic" tuning from the early 1970s, including six of the most common knee levers.[44] The typical configuration almost always features those I have labeled D, E, and F, and one or two of the others. The last is labeled V, as it is commonly found on the vertical knee lever.

[44] The "chromatic" nomenclature arose from either to a misunderstanding of "diatonic" and "chromatic," or to the tendency for players to refer to the second string as Eb rather than D#.

String	1	2	3	4	5	6	7	8	9	10
Pitch	**F#4**	**D#4**	**G#4**	**E4**	**B3**	**G#3**	**F#3**	**E3**	**D3**	**B2**
Pedal A					+C#4					+C#3
Pedal B			+A4			+A3				
Pedal C				+F#4	+C#4					
Knee D		-D4/C#4							-C#3	
Knee E				-D#4				-D#3		
Knee F				+E#4				+E#4		
Knee G	+G4						+G4			
Knee H						-F#3				
Knee V					-A#3					-A#2

Figure 2-18. E9 "chromatic" tuning, ca. 1970, showing multiple possible knee levers.

Refining the Mechanical Script

As the pedal steel's musical features evolved, it fell back to the designers and manufacturers to perfect the mechanisms, particularly in the areas of flexibility of configuration and tuning stability. In the 1960s, two companies emerged as the dominant pedal steel manufacturers: Sho~Bud in Nashville, and the Emmons Guitar Company in North Carolina. Although their efforts were complemented by a host of smaller companies throughout the United States, the instruments made by these companies in the 1960s and 1970s solidified the pedal steel's visual aesthetics, mechanical function, and sound.

Dissatisfied with Shot Jackson's desire to maintain the status quo of the Sho~Bud design despite the potential for advancement demonstrated by the Fender steels, Buddy Emmons parted ways with Jackson in the early 1960s to found his own company.[45]

[45] Emmons's recollections about the origins of the Emmons company can be found at "Buddy Emmons Q&A," *The Pedal Steel Pickers' Page*, http://www.amug.org/~a249/qa.html; and Buddy Emmons, "From Concept to Production," on *The Emmons Guitar Website*, ed. John Lacey, http://www.melmusic.com/laceyj/page02.html.

Emmons's father, a machinist, made the prototypes for a new mechanism that Emmons had sketched while touring with Ernest Tubb. In 1962, Emmons met a physicist and amateur pedal steel maker from North Carolina named Ron Lashley. Their ensuing partnership resulted in one of the most highly regarded pedal steel designs in the instrument's history, which is still favored by many players in the twenty-first century.

The major innovation of the Emmons pedal steel was the push-pull changer, which not only allowed each string to be raised (as the force applied the pedals was mechanically transferred to a pull on the changer) and/or lowered (with the same force resulting in a push), but also did so while maintaining constant direct contact between the string and the wood of the instrument's body. This was achieved by attaching each string to a two-piece "finger" that combined the function of the two different types of mechanism used on the Sho~Bud.[46] Emmons also created a new visual aesthetic for the instrument, covering the body in a layer of Formica in a variety of colors and patterns, most notably a glossy black. Combined with its new look and its name recognition, the versatility and stability of the Emmons pedal steel made it a top choice for professional players.

By the mid-1960s, the barriers to change put in place by Shot Jackson eroded, as his sons David and Harry had essentially taken over the business. Harry worked in the custom shop, making pedal steels, while David was responsible for the new designs that allowed Sho-Bud to not only keep up with, but also dominate the emerging field of pedal

[46] Ronald T. Lashley and Buddie G. Emmons, *Guitar Tone Changing Device*, U.S. Patent 3,447,413, 18 March 1965 (3 June 1969).

steel manufacturers.[47] David's designs propelled the instrument forward, eventually surpassing the Emmons push-pull to set the standard for the functionality of the modern pedal steel. His first design, informally known as the "Fingertip" model (patent applied for in 1966), followed the Emmons in allowing for each string to be raised and lowered by any of the pedals or knee levers.[48] The most significant difference between the Fingertip and the Emmons was that a new *three*-piece finger that allowed both raises and lowers to be activated by a pulling motion. This unidirectional, "all-pull" mechanism afforded a more streamlined undercarriage and a resulting reduction in the size and weight of the body. Additionally, whereas the fine-tuning of the Emmons mechanisms required a tuning wrench, the Fingertip derives its name from the fact that it could be tuned using the hand alone.

Jackson refined the all-pull concept further with the designs of the Professional model (patent applied for in 1968), and the Super Pro (patent applied for in 1976).[49] In the 1968 design, Jackson improved the accuracy of the tuning by moving the adjustors from the top of the body to the endplate, losing the ability to tune with the fingers, but gaining a significantly more stable mechanism. Like the Fingertip and the Emmons, though, each string only had three tunable positions: a "home" pitch, a raised pitch and a lowered pitch. If a string was to be affected by more that one pedal, such as the higher E

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[47] Jackson Steel Guitars, "The Family," www.jacksonsteelguitars.com/family.html, accessed 20 February 2007.

[48] David H. Jackson, *Tuner for Electric Steel Guitar*, United States Patent 3,407,697, 22 August 1966 (29 October 1968).

[49] David H. Jackson, *Pitch-changing Tuning Device for Stringed Instruments*, United States Patent 3,688,631, 27 December 1968 (5 September 1972); David H. Jackson, *Changing Pedal Actuated Pitch-changing Means for a Stringed Instrument,* United States Patent 4,080,864 12 May 1976 (28 March 1978).

string, which is raised to F# by Pedal C and F (E#) by a knee lever, the adjustments had to be made under the body. Subsequent Professional models solved this problem by adding a second point of connection to the raising portion of the finger. The 1976 design shows two tunable points for both the raises and lowers, which is referred to as a "double-raise, double-lower" system. This allows any string to have up to five tunable pitches. Almost all pedal steel designs after 1975 offer variations on this system, either in the number of raises and lowers (up to four raises and three lowers), the possible range of pitch change (up to an octave), or in adjustments to the "feel" of the mechanisms via alternations to the linkages.

The attention to the finer details of function evident in the patents of the 1970s attests to a shift from the development of new mechanisms to the perfection of what had already been established. This shift also demonstrates both the increasing stability of the pedal steel's musical script and the differences that marked the mechanical thinking and musical thinking throughout the entire process of its development. Whereas the musical scripts evolved around specific uses of specific strings (most readily seen in the predominance of changes involving the strings of the E major triad), the mechanical scripts show a more systematic approach, with all of the features available for all of the strings. While the call-and-response between the pedal steel's musical and mechanical ideas in the 1950s was driven by musicians' desire for new technology, by the 1970s, the mechanisms offered far more possibilities than musicians sought to use. As I will discuss in Chapter 4, the reasons for this tapering off of musical exploration were largely cultural. It is important however, to first go back and examine the cultural contexts in which the pedal steel came to be in the 1950s to the early 1970s.

The Pedal Steel and the Music Industry

The formative dialogue among pedal steel guitarists, instrument makers, and instruments took place primarily within the specific cultural contexts of the music industry centers of Nashville and Southern California. As such, the instrument's development was influenced by the demands, predilections, and proscriptions of forces whose primary concerns did not include the pedal steel's musical and mechanical development. Among these forces were other musicians, particularly the star artists who provided employment for players; music industry gatekeepers, including recording producers, label executives, and radio DJs; and audiences, including critics and the general public. These forces acted in addition to—and sometimes in opposition to—the creative pursuits of steel guitarists as they explored the possibilities of their developing instrument. Players reacted in different ways to the cultural scripts that they were expected to enact, depending on their own professional, artistic, and social situations. The remainder of this chapter presents three cases that show the impact of the music industry on the creative efforts of players, the use of the pedal steel within the country genre, and the reception of the pedal steel outside of country music.

Sticking Close to the Melody: Pedal Steel Virtuosity and the Aesthetics of Genre

A prime example of the tension between individual creativity and the boundaries of genre-delineated performance practices can be seen in an encounter behind the scenes of the recording of Ernest Tubb's track "Half a Mind" (Fig. 2-9, above).On 11 June 1958, in Nashville's Bradley Film & Recording studios, Tubb and his band of seasoned session musicians were working out an arrangement for "Half a Mind," which was penned by

Roger Miller and destined to be Tubb's first top-ten single in four years. At the urging of producer Owen Bradley, Tubb had consented to allow the newly hired Buddy Emmons to take the lead instrumental accompaniment, a role customarily filled on Tubb's recordings by guitarist Billy Byrd. Given Emmons's known penchant for challenging stylistic conventions with his "wild" playing, Tubb had been reluctant to hire him, but had conceded upon the encouragement of his band members. Tubb was known for his playful banter with his instrumentalists, and the young virtuoso was often the target of his theatrical teasing. During this session, however, Emmons's enthusiastic explorations of his newly split A and B pedals prompted Tubb to admonish him more seriously with the discreet interjection, "Can you stick a little closer to the melody, son?"[50]

The policing of Emmons's playing by Tubb highlights the unwritten rules governing the use of instruments in commercial country music that supersede the exploration of their musical capabilities. A parallel example of this is, of course, producer Owen Bradley's role in bringing Bud Isaacs's playing to the front of the arrangement of "Slowly." The difference between Bradley's enabling influence and Tubb's restrictive guidance belies a contradiction of the commercial Nashville recording scene: musicians were expected to play to a high degree of perfection and to creatively contribute hooks and licks to enhance a track's salability, but to limit their musical expression to the "service of the song"—perhaps more accurately the service of the song's iterations of its own authenticity to the genre.

[50] This incident is recounted by Emmons on Renn, "Buddy Emmons Q & A." Other details of this period of Tubb's career, including his interactions with Emmons, can be found in Ronnie Pugh, *Ernest Tubb: The Texas Troubadour* (Durham, NC: Duke University Press, 1996), 229–32, and in Pugh's sessionography, 334.

The inherent contradiction exposed by Tubbs's interpretation of country authenticity is that country music (like many other genres) is grounded in the give-and-take of tradition and innovation—the blend of the old and the new.[51] The situation is further complicated by differences in the various regional and stylistic subgenres that fall under the umbrella of "country." While Emmons may have consistently played at the boundaries of what was considered acceptable musical expression for a sideman in Nashville, on the West Coast, a lack of assertive individualism could also be an issue for a player seeking to be gainfully employed. In a 1980 interview, Ralph Mooney recounts that he was admonished at the onset of his career for sticking *too* close to the melody.[52] Successful performers in the West Coast style, playing behind such artists such as Buck Owens and Merle Haggard, would avoid a direct realization of the vocal melody, but would create their own version of the melody based on their own sense of style and the idiosyncrasies of their instrument. The forces that guided the use and development of the pedal steel are thus not monolithic, but a conglomeration of region-specific aesthetics and the stylistic conventions of smaller musical subcultures. The presence of such disparate standards between contemporary styles highlights the need to interrogate existing narratives in order to better understand the flow of musical ideas within genres. One of the best-known narratives of a music industry priority that affected the activities of country musicians is the effect on steel guitar players of the commercial trend known as the "Nashville Sound."

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[51] As explored in Richard Peterson, *Creating Country Music*.

[52] Carter and Sallis, "The Ralph Mooney Story," 21.

"Unprofitable Instruments"?: The Pedal Steel and the "Nashville Sound"

The Nashville Sound is an aesthetic construct that was the result of a concerted effort by a number of country artists—encouraged and abetted by executives and producers—to crossover to the pop music charts.[53] This was accomplished by what country historian Bill Malone considers a compromise between a perceived "feel and ambience" of country music and a pop aesthetic that removed country's "harder sounds."[54] The advent of this style was both a response to the success of covers of country songs by pop artists and the challenge to the rising popularity of country presented by the emergence of rock 'n' roll in the mid-1950s.[55] As some country artists continued to modify their music in search of broader appeal, the proponents of Nashville Sound sought to weed out elements that were heard as overly rustic or "twangy." Consequently, the fiddle and steel guitar that were hallmarks of the recordings of Hank Williams, Roy Acuff, Ernest Tubb, and other "deep-dyed rural singers" were absent from many of these recordings.[56] As guitarist and producer Chet Atkins summarizes, "we took

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[53] Artists who made their names in this style include Jim Ed and Maxine Brown, Skeeter Davis, Don Gibson, Jim Reeves, and Patsy Cline.

[54] A common criticism of this movement was that it led to the inevitable "dilution" of country's identity at the hands of a "juggernaut of homogenization." Malone and Neal, *Country Music U.S.A.*, 256. Other scholarship has taken a more measured tone, considering the Nashville Sound to be a part of the continuum of country's evolving sound. See, for example, Hemphill, *The Nashville Sound: Bright Lights and Country Music*; Ivey, "Commercialization and Tradition in the Nashville Sound"; and Jenson, *The Nashville Sound*. In one of the most recent publications concerned with the issues of authenticity and commercialism, Diane Pecknold argues that throughout the course of country history, the binary opposition of the two ideas does not accurately reflect the concerns of artists or fans. Pecknold, *The Selling Sound: The Rise of the Country Music Industry* (Durham, NC: Duke University Press, 2007).

[55] A notable example of a hit pop cover of a country song is Tony Bennett's 1951 recording of Hank Williams's "Cold, Cold Heart."

[56] Malone and Neal, *Country Music U.S.A.*, 258.

the twang out of it…the steel guitar and the fiddle, which branded a song as strictly country."[57]

At the heart of the Nashville Sound was a core of professional studio musicians, led in large part by Atkins, who combined expert musicianship with a simple and flexible system of notation to foster their ability to rapidly produce commercially friendly recordings matched to any singer's personal style. These same musicians formed the nucleus of the recording ensembles used by honky-tonk mainstays such as Ernest Tubb and Ray Price, supplemented by such important steel guitarists as Don Helms (best known for his work with Hank Williams), Jimmy Day, and Emmons.[58] While players like Helms ensured the preservation of steel guitar traditions from the 1940s, the innovations of Emmons, Day and others showed that the instrument could be adapted to meet the demands of evolving styles and tastes and that twang was only one of its dialects. The steel remained an important part of the overall country sound, and the advances of Emmons and his contemporaries can be seen as a different response to Chet Atkins's call for a removal of the supposed taint of rusticity.

The boundaries imposed by the various forces of the country music recording industry, therefore, placed limits on the musical uses of the pedal steel that curtailed the full exploration of its mechanical possibilities. This did not mean, however, that players did not explore them; as seen in the musical examples above, this response is distinctly

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[57] Nicholas Dawidoff, *In the Country of Country: People and Places in American Music* (New York: Pantheon, 1997), 186. Although Atkins receives most of the credit and/or blame for the Nashville Sound, other producers were also prominent, including Owen Bradley and Don Law, Malone and Neal, Country Music U.S.A.,257; Ivey, "Nashville Sound." 132.

[58] Malone and Neal, *Country Music U.S.A.*,258; Rich Kienzle, Liner Notes, *Ray Price and the Cherokee Cowboys*, Bear Family Records BCD 15843 JK, 1995; Pugh, *Ernest Tubb*, 361–437. Price's independence is further discussed in Daniel Cooper, "Being Ray Price Means Never Having to Say You're Sorry," *Journal of Country Music* 14, no. 3 (1992): 22–31.

manifest in the pedal steel's increased capacity for diatonic harmonies and melodic lines. Additionally, players such as Emmons found alternative places for their musical and technological explorations in other venues and in other genres of music. The former included late night jam sessions in the bars of Nashville, as well as the somewhat less constrained environment of live performance, especially the dancehall, where musicians were given more room to stretch their playing. The latter path lead to the pedal steel's appearance in other genres, including Emmons's 1963 album *Steel Guitar Jazz*, on which he demonstrated his ability to realize the progressive jazz style on the ostensibly "country" instrument.[59] The availability of these alternate venues impacted dynamics within country music, as players saw themselves as having more options. Chafing at the restrictions placed on his playing by Tubb's conservative leanings, Emmons left the Troubadours around the same time to take Jimmy Day's place in Ray Price's Cherokee Cowboys, a road band that maintained a specialty in hard country shuffles.[60] Price's recordings, however, were shifting to a decidedly more pop sound, bolstered by large string sections in place of one to three fiddles, and although Emmons remained part of Price's ensemble until 1967, in 1968 he left Nashville behind to seek other musical opportunities in Los Angeles. In L.A., the pedal steel found an enclave in the emerging subgenre of country rock, where its players continued to explore its musical and mechanical scripts, and it was absorbed into a new cultural script within American music.

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[59] Not coincidentally, this recording took place not in Nashville, but in New York City. Buddie [sic] Emmons, *Steel Guitar Jazz*, Verve 542 536, 1963.

[60] Emmons felt a strong rapport with Price that fostered a highly creative environment in the studio. Kienzle, *Southwest Shuffle*, 172.

American Exotic: The Pedal Steel in Rock

A contrasting trend to the efforts of Atkins and other figures of the Nashville Sound to remove the "rustic" elements of country music in pursuit of greater commercial success was the move by some rock musicians, particularly those of the 1960s counterculture movement, to incorporate elements of country music in a quest for a *less* commercial sound. Towards the end of the 1960s, the steel guitar's strong associations with the "country" element of country music included the full gamut of steel guitar styles, from the resonator guitar to the pedal steel, which had reclaimed its place in mainstream country music thanks to ongoing shifts in style as well as the efforts of session players such as Lloyd Green, Pete Drake, Hal Rugg, and Weldon Myrick to strike a balance between traditional and contemporary styles. Perhaps part of a reaction to the mining of American blues by bands associated with the British Invasion and the whitewashing of vernacular music that was the Folk Revival, American rock musicians looked to earlier country music as an "authentic" alternative to the dominant soundscape. Through the efforts of these musicians, instruments like the steel guitar, the banjo, and the fiddle became part of a new kind of internal exoticism, in which the past and the present, the authentic and the constructed, the real and the imagined America all collided. The resulting music formed the germ of the new subgenre of country rock, in which the pedal steel often played a major role.[61]

At the forefront of this trend was Bob Dylan, a musician who had only recently defected from the ranks of the folk revival with his infamous shift to an electrified sound.

[61] The history of country rock is discussed in Peter Dogget, *Are You Ready for the Country* (New York: Penguin Books, 2000); and John Einarson, *Desparados: The Roots of Country Rock* (New York: Cooper Square Press, 2000).

Dylan's influence on the music of the late 1960s can hardly be overstated. Numerous artists adopted his songs, as well as his approach to songwriting, singing, arranging, and recording. Following the 1965 tour featuring his full electric band, Dylan took an introspective shift towards country music, coming to Nashville in 1967 and again in 1969 to record his albums *John Wesley Harding* and *Nashville Skyline*. For these albums, Dylan recruited a small group of local session musicians, including steel guitarist Pete Drake. Through Dylan, the pedal steel was introduced to Beatle George Harrison, who hired Drake to fly to London in 1970 and play on his first solo album, *All Things Must Pass*.[62] Harrison's engagement with the pedal steel, although tangential to the development of country rock, was emblematic of the trend of "borrowing" the pedal steel from country music without necessarily attempting to work within the genre.[63]

Formed in California in 1965, the Byrds achieved their earliest success through a cover version of Dylan's iconic early song, "Mr. Tambourine Man." In the hands of the Byrds, Dylan's folk-derived composition was transformed into an electrified anthem, replete with a jangling electric twelve-string guitar, drums, and the band's signature three-part vocal harmonies. On the one hand, this track was an American response to the influence of the Beatles, but on the other hand, it marked the beginning of a distinctly American style of politically conscious, musically ambitious, and firmly countercultural rock music. By 1967, the Byrds had ventured farther into the non-Western music (via jazz) and drug-influenced realm of psychedelic rock, as demonstrated by the song "Eight

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[62] Drake claims that this was his introduction to the music of the Beatles. Pete Drake, interview by Douglas B. Green, 8 March 1973, interview OH519-LC, transcript, Country Music Foundation Oral History Project, Country Music Hall of Fame and Museum, Nashville, TN.

[63] Similar use of the pedal steel can be heard on Elton John's 1972 song "Tiny Dancer" and Van Morrison's albums *Tupelo Honey* (1971) and *St. Dominic's Preview* (1972).

Miles High." With ostensible bandleader Roger McGuinn seeking to continue pursuing a jazz-oriented sound, the Byrds hired pianist Gram Parsons, who unbeknownst to McGuinn was a devotee of country music and an aspiring singer and songwriter. McGuinn's plans for an experimental double album were soon scrapped, and in 1968 the Byrds followed Dylan's path to Nashville, where they recorded the first tracks for the album *Sweetheart of the Rodeo*.

While in Nashville, the Byrds, like Dylan, took advantage of the local talent, hiring Lloyd Green to augment their sound with his pedal steel. Expecting to work in his typically supportive role, Green was enthusiastically responsive to the Byrds's instructions for him to play the whole time rather than judiciously waiting his turn, as he would on a normal studio job.[64] This attitude alone shows a blurring of the musical and cultural boundaries of country and rock. The contributions to *Sweetheart of the Rodeo* by Green, along with those of Los Angeles session player JayDee Maness, set the bar for a new pedal steel style that combined the traditional sounds and licks of country steel guitar with a more riff-oriented approach to accompaniment and a freer approach to lead playing. The hybridity of this style can be seen in Green's playing on the Dylan cover "Nothing Was Delivered" and the track "One Hundred Years from Now," one of the two Parsons compositions included on *Sweetheart* (see Fig. 2-19).

[64] Liner notes for the Byrds, *Sweetheart of the Rodeo*, Legacy edition, Columbia/Legacy C2K 87189, 2003, 2 CDs.

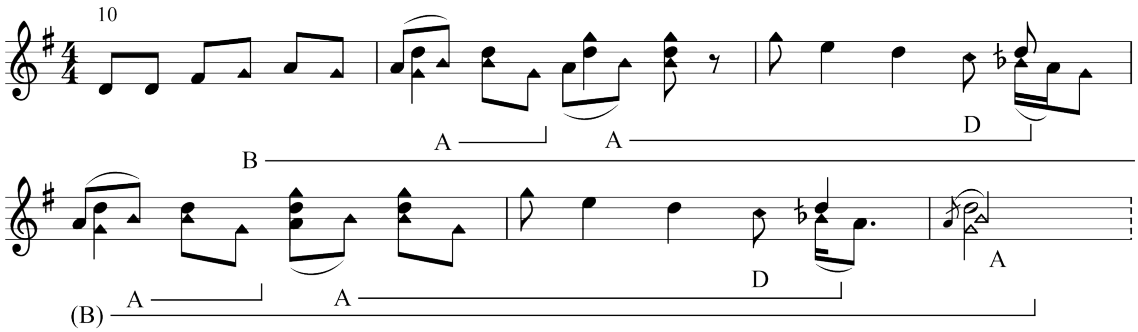

Figure 2-19. The Byrds, "One Hundred Years from Now" (rec. 1968), pedal steel intro by Lloyd Green [0:00–0:10].

A difference from a typical country steel guitar part is heard immediately in the introduction to "One Hundred Years From Now," as Green plays his opening run in straight eighth notes rather than the bouncy swing that a similar passage would have in a country shuffle. The remainder of the opening solo is centered on a repeated two-measure phase that acts as a quasi-ritornello throughout the entire track. The first half of the phrase is a driving riff centered on the use of the A pedal, but giving equal eighth notes to the dissonant A and its resolution to B within a G major triad. This is followed by a single-note melody on the "chromatic" strings culminating in a bluesy smear from a slightly flattened third (via a partial release of the A pedal) down the scale to the tonic. Played entirely in one left-hand position, this passage emphasizes the distinctive sound of the pedals while incorporating the rhythmic drive and repetition typical of a rock guitar riff.

The Byrds' use of the pedal steel established the instrument as a key element of the country rock sound. Whereas *Sweetheart of the Rodeo* featured players imported from the ranks of veteran country players, the bands that followed in this genre more often saw the steel taken up by players who were relatively new to the instrument. Among the most

famous of these new players was Jerry Garcia, lead guitarist for the Grateful Dead, who took up both banjo and the pedal steel in his forays into country music. Garcia's pedal steel playing is most famously featured in the song "Teach Your Children Well" from Crosby, Stills, Nash, and Young's 1969 album *Déjà Vu*. This track shows Garcia approaching the steel in much the same way as the guitar, playing fairly free melodic lines (some would say "noodling"), but incorporating typical use of the A and B pedals. Garcia formed the country rock group New Riders of the Purple Sage as a vehicle for his exploration of the pedal steel, although he abandoned the instrument after the early 1970s, citing the difficulty of keeping up its technique as a secondary instrument.[65]

Such instrumental doubling by rock guitarists became a trend in the 1970s, and can be heard on tracks by Led Zeppelin, Yes (and guitarist Steve Howe's solo records), and even Peter Gabriel's early post-Genesis output. The enthusiasm of these rock luminaries was certainly good for business—Texas-based manufacturer MSA even ran ads aimed specifically at the rock market, with copy emphasizing both the otherness of the pedal steel, and its appeal to rock musicians: "Today, pedal steel players are putting their extra-sensitive sounds into many of rock's top hits. And they're playing side by side with every style of rock because the pedal steel speaks a personal language that's left unsaid by every other kind of guitar… If you want to get rolling in rock's greatest new direction, slide into the sound of the MSA pedal steel guitar."[66]

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[65] For details on Garcia's experience, see Sandy Troy, *Captain Trips: A Biography of Jerry Garcia* (New York: Thunder's Mouth Press, 1994), 133; and Blair Jackson, "Grateful Dead I Have Known," in *The Grateful Dead Reader,* ed. David G. Dodd and Diana Spaulding (New York: Oxford University Press, 2000), 296.

[66] MSA Micro, Inc., Advertisement, *Guitar Player* 8, no. 4 (April 1974): 26.

Some country players, however, looked upon their efforts with a great deal of skepticism, as they regarded the instrument as demanding a high degree of dedication and discipline to be played properly. They also challenged the authenticity of players like Garcia, who they saw as operating outside the tradition established by Isaacs, Emmons, Day, and the other key figures in the pedal steel's history. In a 1980 article, Emmons expresses his annoyance at being asked by producers to imitate the sound of one of these players: "One time they wanted me to sound like a certain inexperienced player who had played on a pretty fair-sized record—I had to forget everything I had learned."[67]

Indeed, the adoption of the pedal steel by rock musicians demonstrates the contingencies of the technological, musical, and cultural scripts that are attached to musical instruments. While the pedal steel developed in the specific context of 1950s and 1960s country music, the growth of its technology and the increase in its availability from high-profile manufacturers such as Fender led to its accessibility as a technological object divorced from its musical and cultural origins. Particularly in the context of rock, a genre that values originality and personal expression, musicians might acquire an instrument with little exposure to its use in country music, and proceed to develop their own idiosyncratic techniques and styles, guided by their own realization of the instrument's technological possibilities and sidestepping the common practices established over the previous decades. In a way, this reflected a continuation of the call-and-response initiated by "Slowly," only focused on the refined technology rather than its established musical identity.

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[67] Quoted in Steve Fishell, "The Future of Pedal Steel: An Artists' Round Table," *Guitar Player* 14, no. 12 (December 1980): 31.

A player who embodied the individualist approach to rock pedal steel was "Sneaky" Pete Kleinow (1934–2007).[68] Kleinow moved to Los Angeles in the late 1950s, and began his dual career as a musician and a special effects artist and animator for television and film. His early animation career included work on the Gumby television show and the 1962 film *The Wonderful World of the Brothers Grimm*, which featured stop-motion animation and was created for the Cinerama format; he would later work on such films as *Star Wars: The Empire Strikes Back* and *Terminator 2*.[69] Musically, Kleinow had studied steel guitar from a young age, but from the perspective of pop music rather than country. Once in California, he began playing with western swing groups, and acquired a Fender 400 pedal steel on which he developed his own eight-string tuning and pedal setup. In 2004, he stated: "My style of playing the steel guitar is very original, and it's original because I never learned to play like everybody else. I had to learn my own methods."[70] In addition to the musical features of his tuning (see Chapter 4), Kleinow brought a new palette of sounds to the pedal steel, which was normally heard with a clean tone apart from reverb. Being one of only a handful of pedal steel players in L.A., Kleinow soon supplemented his performances with session work, recording with such artists as Linda Ronstadt, Joni Mitchell, John Lennon, and Stevie Wonder.[71] He is most

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[68] "Pete Kleinow, 72; Flying Burrito Brothers' Steel Guitarist Helped Create Genre of Country Rock," *LA Times*, 10 January 2007.

[69] Cinerama was an experimental format based on the use of three projectors.

[70] "The Whole Burrito," Documentary film included with Burrito Deluxe, *Disciples of the Truth*, Luna Chica Records 722.

[71] Kleinow's competition included Red Rhodes, who played with Michael Nesmith, James Taylor, and the Carpenters; and John McFee, a multi-instrumentalist who played on sessions for Van Morrison, the Grateful Dead, and Steve Miller, and was later a member of the Doobie Brothers.

famous, however, for his career with the Flying Burrito Brothers, a group that splintered off of the Byrds in 1969.

From the first track on the Flying Burrito Brothers debut album, *The Gilded Palace of Sin*, Kleinow displays his unique approach to the pedal steel. "Christine's Tune (A.K.A. Devil in Disguise)" begins with Kleinow playing a busy, heavily melodic accompaniment reminiscent of the Bakersfield Sound style of Ralph Mooney; after the second chorus, however, Kleinow engages a distortion effect to switch to a thick fuzz tone. In the absence of a lead guitarist, Kleinow combined what might have been separable roles—the rock lead and the country steel coloration—into one voice. Throughout the remainder of the album, Kleinow's steel changes colors like a chameleon, sounding at times like a fuzzed-out lead guitar, a tremolo-laden organ, and most importantly, like a sonic representation of Nashville. Through his experimental style, Kleinow embodied the cross-generic aspirations of bandleader Gram Parsons, whose vision of a "Cosmic American Music" encompassed rock, country, R&B, and soul under the umbrella of a drug-influenced mysticism and *joie de vivre*.

In many ways, Kleinow's color-heavy approach continued the role of the steel guitar from as far back as the 1920s, when it served as a representation of Hawaii in the songs of Jimmie Rodgers and others. Recast almost fifty years later, the pedal steel was used to bring "America" back to American music, acting as a conduit to that earlier style while simultaneously standing for the perceived honesty, integrity, and conveniently ambiguous authenticity of "non-commercial" country music. This new cultural script allowed for the exploration of new musical scripts for the pedal steel, and helped the instrument find both a new audience and a new pool of players.

Conclusions

The evolution of the technological, musical, and cultural scripts of the pedal steel guitar demonstrates that musical instruments embody a dynamic exchange of ideas, contingent upon diverse flows of information and values. Mechanically, the pedal steel developed as an instrument entirely customizable by its player—a set of possibilities rather than a predetermined system. These possibilities were often worked out in the extra-musical realm of tinkering and invention, and documented through patents—themselves embodiments of the notions of progress and technological idealism (if not utopianism). As such, the design of the instrument was alternately influenced by the needs of specific musical contexts and the idea of a universally applicable system. In practice, however, the development of the pedal steel as a specific, concrete entity was primarily driven by a fairly constrained set of musical principles and practice. These musical ideas evolved in tandem with the technology, as players communicated among themselves through both direct contact and, to a greater extent, recordings, and with instrument designers and makers, who sought to respond to their feedback. The evolution of the instrument was tempered by the cultural contexts in which it was primarily used, particularly the commercial recording industry. Since most players depended on steady work for their livelihood, they tailored their playing to the predilections and demands of the cultural gatekeepers who controlled the circumstances of their employment. Thus, singers, record producers, and executives all asserted an influence on the instrument's trajectory without any direct concern for the details of its technology or the full range of its expanding musical possibilities. One could imagine this process carrying on indefinitely, but certain circumstances that developed in the 1970s contributed to an

evening out of the different scripts, which had fluctuated in dominance to this point. This leads to the question: when is a technology finished, or in the terms of Science and Technology Studies, closed? As I will demonstrate in Chapter Four, the answer to this question for the pedal steel lies in a shift of the instrument's cultural context from exclusively the realm of professional players and the music industry to a greater presence in amateur music making. First, however, I will turn to a more detailed examination of the thought processes that guided a number of the professional players introduced in this chapter, and the ways in which individual performers developed their own personal scripts that reflect both the larger dialogue between technological and musical ideas and a more intimate dialogue between musician and instrument.

CHAPTER THREE

THINKING IN STEEL/THINKING OUT THE STEEL

The pedal steel is a daunting instrument.

From the sheer number of strings (particularly on a double-neck model) to the array of foot pedals and the close-fitting knee levers to the lack of fixed points of intonation aside from the open strings (which must be tuned as many as five times—once for each pitch-changing device, in addition to its open pitch), the instrument challenges the aspiring player mentally, physically, and musically. Even when restricted to a single ten-string neck tuned to the common E9 tuning, the pedal steel requires forms of movement and thought that are seldom encountered elsewhere. The complexity of this tuning and setup can be illustrated by undertaking the relatively *simple* task of locating the pitch A5 (880 Hz). As on many stringed instruments, any given note can be played by stopping several of the instrument's available strings in different positions; in the case of A5, it can be found on all ten strings of the E9 tuning (see Figure 3-1).

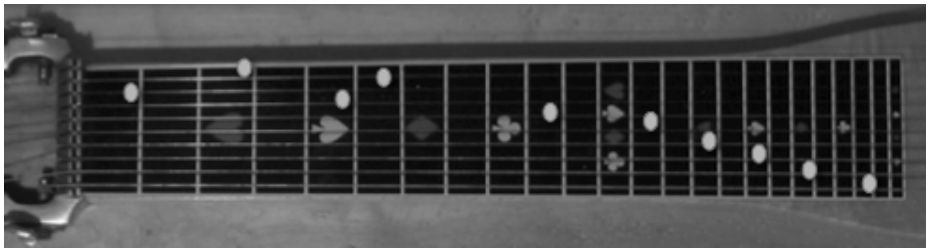

Figure 3-1. Player's view of E9 neck, showing A (880 Hz) on all 10 strings (unaltered). Photograph by the author.

These ten locations alone provide plenty of options to navigate, but the addition of the typical array of three pedals and five knee levers, as well as the common technique of playing the harmonic (chime) one octave above the bar, results in an additional thirty-six locations for that same A, for a total of at least forty-six (see Figure 3-2). These forty-six options include as many as eight options on one string alone, and one fret position where it can be played five different ways on four different strings. Each of these options fits into a different timbral, gestural, and technological context, each of which has been influenced in turn by the historical dialogue between the instrument and its users.

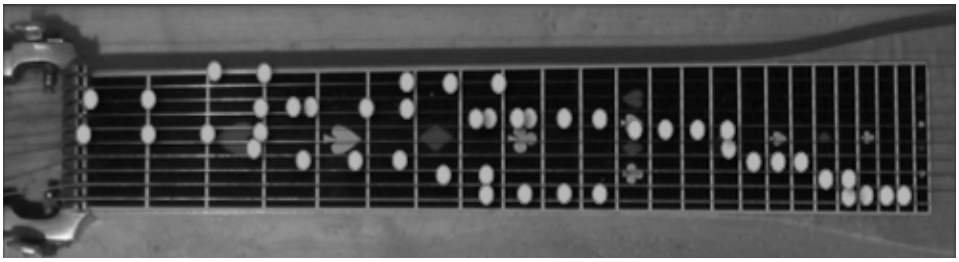

Figure 3-2. Player's view of E9 neck, showing all possible locations/executions of A (880 Hz).

In this chapter, I take a player's-view approach to the pedal steel to demonstrate that individual musicians are deeply influenced by their embodied interactions with the mechanical, musical, and cultural scripts of their chosen instrument. Grounded in the sonic, haptic, and musical feedback they experience during countless hours of practicing and performing, players develop their own *personal scripts* for the use of their instrument. This individualized process fosters a fundamentally different form of thinking than the intrinsically social transmission of the mechanisms envisioned by designers, the

musical scripts that emerge as an instrument's common practice, and the cultural scripts that reflect an instrument's role in a genre or community.

I distinguish two separate aspects of this co-constructive dialogue between players and instruments: the creative and the analytical. The creative process is sparked by players' engagement with their instruments. I use the concept of *instrumental ideation* to contrast this phenomenon from perception or cognition, which have been studied primarily as biological processes that underlie musical experiences and are measureable as patterns of nerve impulses and brain waves. Although the pursuit of these quantifiable markers provides invaluable insight into the nature of music, I propose that creativity runs across and against biological factors as much as it impacted by them, particularly in the case of oral traditions. As such, I approach musicians' views on playing, composing, and listening through ethnographic rather than empirical data, particularly the direct aural evidence offered by recordings and the interpretations of their own processes expressed through interviews. The latter stream of evidence is also crucial to investigate the analytical aspect of the player-instrument relationship, which I discuss as a form of *vernacular music theory*. For many players, the idea of music theory is itself a cultural script that either prescribes "correct" ways of making music, or simply offers the means to talk about playing through the nomenclature of notes, chords, keys, etc. Frequently attached to the idea of musical literacy, music theory is seen as antithetical to authenticity, and vernacular musicians often cite their inability to read music as a point of pride. Nonetheless, almost all players engage both individually and collectively with music on some kind of analytical level. These levels range from a solo performer's general sense of how notes and chords relate to one another to complex systems of

implicit or explicit rules that govern group performances.[1] As discussed in Chapter Two, these rules often center on concerns related to the overarching aesthetic and social dynamics of performance (i.e. the role of virtuosic performance within popular music formats), leaving the technical aspects of music to be subsumed within complex equations of cultural competency. I employ the term vernacular music theory specifically to target ways in which musical thinking of popular musicians engages with the dominant discourses of Western music theory.

The intertwined natures of instrumental ideation and vernacular music theory is demonstrated in ethnomusicologist John Baily's research on the use of several varieties of lute in the music of Afghanistan. In his research, Baily focused primarily on the performing traditions of two prominent Afghani lutes, the rubab and the dutar.[2] He begins by defining instrumental performance as "patterned movement in relation to the active surface of an instrument," and contends that the patterns that constitute musical performance occur "within a spatial framework determined by the layout of the instrument."[3] The physical layout of a given instrument, therefore, asserts an influence on the composition and execution of the music it is used to play.

The main difference between the rubab and the dutar is the manner in which the disposition of the strings demands particular uses of the left hand. Baily asserts that the

> differing spatial properties of the two [instruments] encourage the use of some kinds of movement patterns and tend to inhibit others in

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[1] Examples of these types of socially constructed rules are discussed in Berliner, *Thinking in Jazz*; and Benjamin Elon Brinner, *Knowing Music, Making Music: Javanese Gamelan and the Theory of Musical Competence and Interaction*. (Chicago: University of Chicago Press, 1995).

[2] A summary of his research is found in John Baily, "Music Structure and Human Movement," 237–58.

[3] Baily, "Music Structure," 237.

> performance. For the left hand, the frets on the instrument… constitute a set of target positions. These might be located visually, kinesthetically, or tactually; the specific modality does not matter; movement patterns are planned and experienced in relationship to this internal representation of the fretboard's spatial properties.[4]

The stringing of the dutar places the notes to be fingered by the left hand in what Baily terms a *linear array*, that is one in which notes are only fingered on one string, requiring movement up and down the neck to produce notes beyond a melodic third. The rubab, in contrast, features a *tiered array*, similar to the Western guitar or violin, in which the most commonly used notes are found in one position across a set of four strings.

Baily posits that due to their layouts, melodies generated on the rubab tend to employ more scalar figures than those generated on the dutar, which are more often based on clusters of notes ("pattern[s] consist[ing] of a series of finger operations from a single hand position or from two adjacent hand positions").[5] These tendencies lead to the codification of a "motor grammar" specific to each instrument.[6] By "encourag[ing] the use of some kinds of movement patterns and tend[ing] to inhibit others in performance," the instruments themselves thus exert an influence on both the musical ideation and the theoretical conception of music by their players.[7] A potential danger with Baily's thesis is the assumption of a kind of instrumental determinism, in which instruments are granted a degree of control over their players. Baily and Driver acknowledge, however, the limits of these tendencies—that instruments are used in multiple musical contexts, that

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[4] Baily, "Music Structure," 251-252.

[5] Baily, "Music Structure," 253.

[6] Baily, "Music Structure," 242.

[7] Baily, "Music Structure," 252.

structurally disparate instruments are used in heterophonic iterations of single melodic lines, and that mastery of an instrument allows a player to supersede its limitations.[8]

Despite these qualifications, Baily and Driver's theories resonate with recent work by scholars from a wide range of disciplines. Jazz and African American music scholar Ingrid Monson, in her research on the Malian balafon, suggests that musicians rely on "embodied knowledge" of performance to free their "conscious minds for aesthetic discovery and expression."[9] She argues, however, that musicians employ a form of "perceptual agency," shifting their focus between the needs of the instrument, the conventions of style and genre, and their own creativity. While Baily presents the "visual, kinesthetic, and tactual" modes of navigating an instrument's layout as equivalent, I propose that players shift between these modes in specific ways that determine their individual musical experience. A logical extension of this idea is that instrumentalists (particularly those operating outside the notated art music tradition) draw upon the embodied process of learning and playing a given instrument to formulate their personal scripts for using their instrument, in conjunction with its existing mechanical, musical, and cultural scripts. The balance between individually determined and socially driven technological scripts is evident in the audible uniqueness of player styles, and reflects one of the key elements of human experience—the exercise of individual agency.

The pedal steel guitar is distinctively suited to illustrate the intersection of mind and body that constitutes the player-instrument relationship, and the workings of both instrumental ideation and vernacular music theory. From the exact functions of the pitch-

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[8] Baily and Driver, 59. Baily also mentions the issue of virtuosity in "Music Structure," 256.

[9] Monson, "Hearing, Seeing, and Perceptual Agency," S36.

changing devices and their mapping onto the pedals and knee levers to the ergonomic details of pedal heights, ranges of motion, etc., the configuration of an advanced player's instrument typically reflects a series of musical decisions that reveal both taste and practical considerations. For a beginning player, however, the instrument's complexity is often rendered manageable by an approach grounded in the fundamental tools of music theory. Drawing on my own experience studying the instrument, I briefly introduce my exploration of pedal steel–based ideation and music theory by illustrating an approach to the modern E9 pedal steel grounded in my training in classical bass and music theory. This approach illustrates how the basic musical materials of scales, harmony, and diatonic chord progressions engage with the physical dimensions of the pedal steel. Following this introduction, I turn to three case studies that explore the parallel development of the mechanical setups, ideation, and musical theorizing of pedal steel innovators Buddy Emmons (b. 1937), Ralph Mooney (1928–2011), and Lloyd Green (b. 1937). Through analyses of selected recordings of these three players from the 1950s to the 1970s, as well as their own statements about playing, I explore the interconnections among their musical biographies, their histories with the steel guitar, and their individual approaches to playing and thinking about music.

Thinking in Steel: Approaching the E9 Pedal Steel

Unlike the rubab and dutar discussed by Baily, whose techniques revolve respectively around movement across the neck (the "tiered array") or along their neck (the "linear array"), the pedal steel requires substantial engagement with these planes, but adds the third dimension of the operation of the foot pedals and knee levers. The

expansion of movement to these multiple dimensions (both in isolation and simultaneously) necessitates the separate use of visual, tactile, and kinesthetic modes of awareness, each of which are important to different physical tasks and contribute to different musical results. An individual player's strengths in any of these dimensions can therefore lead to an emphasis on one set of patterns over others. In order to discuss the complex physical operations of pedal steel performance, and thus gain insight into their interactions with the processes of perception, cognition, and ideation, I divide the player's interface with the instrument into movement on three planes: the linear, the lateral, and the ancillary (see Figure 3-3).

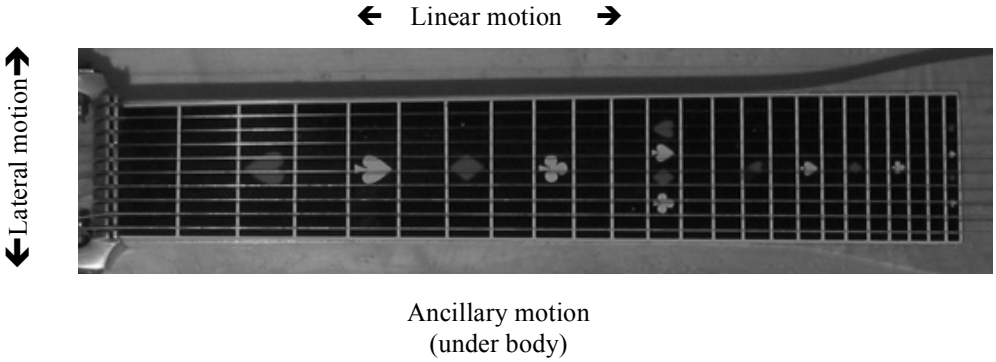

Figure 3-3. The three types of motion of the pedal steel guitar.

The functions of the lateral and linear planes are similar to those of other stringed instruments. The linear plane involves motion from left to right motion (commonly described as "up" and "down" the neck) that corresponds to movement from low pitches to high. On the lateral plane the lowest pitched string sits nearest to the player and the highest farthest away, but with the order disrupted by the re-entrant tuning of strings 1 and 2. The player negotiates lateral motion across the string plane through both right hand techniques and the controlled motion of the bar across the string plane. The pedal

steel's most idiosyncratic features are found under the body of the instrument on the ancillary plane, where the foot pedals and knee levers are used to augment the melodic and harmonic possibilities offered by the other axes. It is in their particular configurations of the pedals and knee levers that players most clearly demonstrate their individual musical conceptions.

As part of my study of the pedal steel, I took lessons with two masters from subtly distinct musical traditions. Mike Auldridge (1938–2012) was one of the first players to introduce the electrified pedal steel guitar to the traditionally acoustic bluegrass ensemble in the 1970s. Buddy Charleton (1938–2011), was best known as one of Ernest Tubb's Texas Troubadours in the late 1960s. Even though I had been learning the pedal steel on my own for several years, I asked both musicians to walk me through what they considered the most essential elements of the instrument's technique. Although much of the material they presented involved simultaneous action in all three planes, I found that most of the core skills were broken into movement in either the linear and lateral planes, both of which are supplemented by ancillary action. In general, melodic playing occurs across the lateral plane, whereas harmonic motion is controlled by linear movement. The combination of these three threads of technique is navigated by means of a "motor grammar" (to use Baily's term) that resonates with music theoretical ideas about harmonic hierarchies.

Navigating Melodies Across the Lateral Plane

Auldridge began my first lesson with a series of G major scales played entirely at the third fret.[10] This series of exercises combines lateral motion across the string plane with ancillary motion activating and releasing pedals A and B, as well as the E knee lever, which lowers string 4 one half step (see Figure 3-4). Through the right-hand technique known as *blocking*, in which the ringing of the strings is stopped with the side of the hand, the knuckles, or the fingerpicks themselves, the action of the pedals can be either masked to create a uniformly articulated scale or one that leaves the action of the pedals audible. Depending on whether the scale is ascending or descending, the seventh degree can be played either on the lowered fourth string or the unaltered second string. As with the pedal action, the overlapping notes of the re-entrant upper strings can be allowed to ring over or cut short, depending on the desired effect.

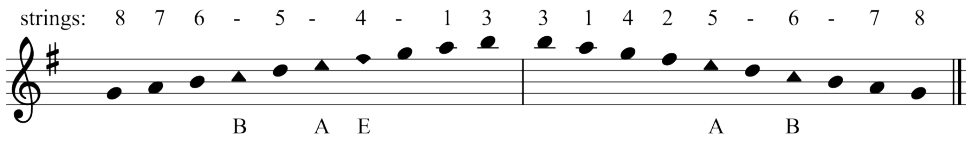

Figure 3-4. G major scale at the third fret.

All of the technical detail involved in executing these motions becomes secondary once a degree of proficiency is achieved, and the musical gestures can be inserted into larger musical units. As shown in Figure 3-2 Auldridge described and demonstrated, the combination of pedal action and movement in the lateral plane can be used to execute

[10] This section, including all transcriptions, is based upon my lesson/interview with Mike Auldridge, Silver Spring, MD, 10 June 2009.

speedpicking passages like that heard in Weldon Myrick's "One-pedal, Two-finger, Three-string Song" in Figure 2-17 (see Figure 3-5):

> So, you get real used to doing that, and these are things that you'll do whenever, in anything you play, you'll hear, you know, fast stuff, and that's all it is, just running the scales fast, right?

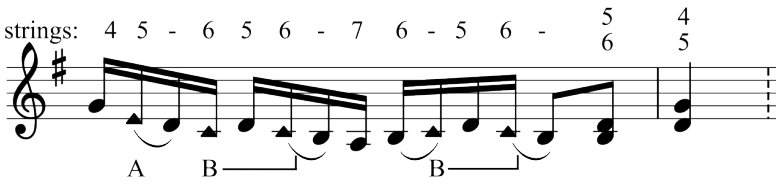

Figure 3-5. G major passage at the third fret.

These techniques can also be extended to include more than one string at a time, resulting in scales highlighting the pedal steel's characteristic diatonic harmonies (see Figure 3-6). Auldridge's verbal explanation of this relatively simple musical material illustrates the complexity of the instrument's technique:

> So, if you're playing a G, and you play 6 and 8…you want to use your thumb and your middle finger. [Then] put your B pedal down and hit 6 and 7, and then open 5 and 6…and then pedal down 5 and 6, and then…5 and [4 with the knee lever], and then 4 and 5.

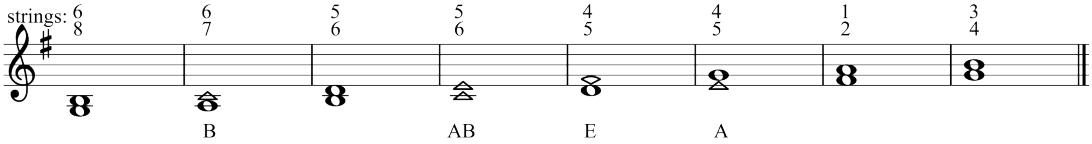

Figure 3-6. Harmonized G major scale at the third fret.

As these examples show, a wide range of melodic and harmonic material is available along the lateral plane of each fret of the pedal steel. Because the notes available at each

fret facilitate access to only a single major scale and the primary triads of that key, it is necessary to move along the linear axis to reach other modes and key areas.

Playing in "Pockets": Navigating Harmonies Thorough Linear Motion

While melodic motion on the pedal steel is produced through movement across the lateral axis, movement of the bar along the linear axis of the instrument transposes the chord produced by the open tuning to a new pitch level at every fret.[11] While the frets are often identified using their number, they are also referred to by the tonic of the major scale found there. Thus, in an E major–based tuning, the eighth fret (eight half-steps above E) could be thought of as the "C fret." This system is complicated in the case of the pedal steel by fluid conceptual shifts between "open" positions, in which the fret coincides with the transposed open tuning, and "pedals-down" positions, which are referred to by the tonic of the chord one fourth higher, which is produced by engaging the A and B pedals. Auldridge, for example, frequently referred to the eighth fret as the "F fret" (i.e. the chord one fourth higher than C), but only occasionally makes the verbal distinction that it is "pedals-down."

Building from the open and pedal-down positions, players use specific movements along the linear axis to orient themselves to the other harmonic possibilities available through the use of the pedals and knee levers. The networks of musical gestures available around the two basic positions are commonly referred to as "pockets."[12] The

[11] The pedal steel is actually an unfretted instrument, but the visual reference of the fretboard is retained for purposes of orientation and intonation.

[12] The use of this and similar terms can be seen in magazine columns and instructional materials by Buddy Emmons and Jeff Newman. See for example Jeff Newman, "The Magic Triangle," *Steel Guitarist* 2 (May 1979): 13, 42; and Buddy Emmons, "The Pocket Corner," *Steel Guitarist* 5 (May 1980): 15–18.

navigation of these pockets is often conceived of in terms of the necessary movements in the linear and ancillary planes. For example, beginning from an open C major chord at the eighth fret, one can play a I–IV–V–V^7–I progression with only the use of the A and B pedals, the E lever, and movement up two frets and back (see Ex 3-7a). With the A pedal and the F lever, an inversion of the major triad can be played between the open and pedals-down position, three frets above the former and four frets below the latter (see Ex. 3-7b). Auldridge suggested another way to play this inversion, beginning a gesture two frets back from the pedals-down position with the E lever engaged, striking strings 5 and 8, and then sliding up to the pedal-down chord (see Ex. 3-7c).

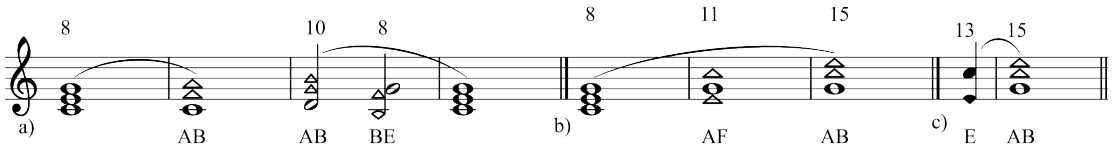

Figure 3-7a–c. Chord progressions in C major "pockets."

Another example of relational thinking in the linear plane is seen in process of locating minor chords, which is particularly a challenge in the major-key oriented E9 tuning. As Auldridge explains, there are several ways to play minor chords, each of which requires different physical motion, but produces the same pitches. This redundancy is similar to the overlapping of pitches on other instruments with tiered string arrays (i.e. the violin and the guitar), but is unique to the pedal steel as, in some instances, the combination of linear and ancillary motion results in a mixture of changed and unchanged pitches. This is shown as Auldridge explained the locations of three E minor chord voicings in terms of their physical proximity to other chords (see Figure 3-8):

> So you really have three easy minors: you got the A pedal; you got the lower of the eighth string, one fret above the pedal-down; and then you got the B and C pedals, two frets below—that would be for the high strings, so all you have to remember is you're two frets below the E major with the B and C.

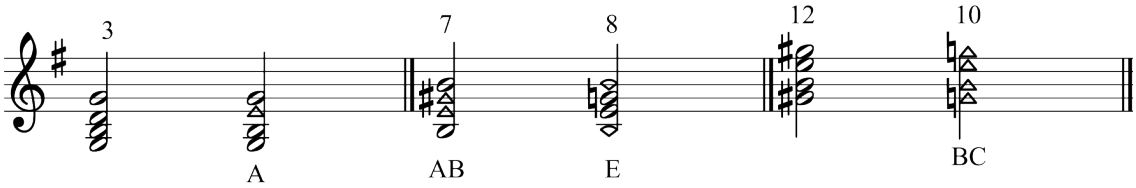

Figure 3-8. Three E minor chords, as related to G major (m. 1) and E major (mm. 2–3) positions.

This example shows how the idiosyncrasies of the pitch-changing devices obscure concepts of directionality and distance, sometimes resulting in an apparent disconnect between physical motion and sound. In the first E minor there is no linear motion—the activation of the A pedal raises the D of the G major triad to E. In the second example, however, the bar is moved up one fret, which would normally raise all of the pitches played one half step. By releasing pedals A and B (which were raising the pitches of strings 5 and 6), and lowering strings 4 and 8, the sounding result is four pitches that remain the same and one pitch that is lowered one half step (E major becomes E minor). This process is reversed in the third example, as the bar is moved back two frets and the activation of the C pedal raises strings 4 and 5 back a whole step to B and E, and the B pedal raises strings 3 and 6 a half step to G-natural. This is just one example of an entire vocabulary of harmonic progressions based on a combination of linear motion of the bar and ancillary motion on the pedals and knee levers.

Defining Musical Thought on the Ancillary Plane

While in many ways supplemental to the actions on the surface of the instrument, the ancillary axis of motion—the activation of pedals and knee levers—is the site of the pedal steel's most distinctive qualities, and thus the site of the most important information relating to instrumental ideation. An examination of the setups used by professional players demonstrates a wide range of individual preferences that reflect both physical and music theoretical concerns.[13] The functions of the knee levers in particular are varied according to the needs of the player. They are identified by an acronym derived from their location (i.e. which knee is used to activate them) and the direction of their movement. Thus, there is a knee lever at the left knee moving left (LKL), at the left knee moving right (LKR), the right knee moving left (RKL), and the right knee moving right (RKR). The most common fifth knee lever is activated by raising the left leg, and is called the LKV (left knee moving vertical) (see Figure 3-9).[14]

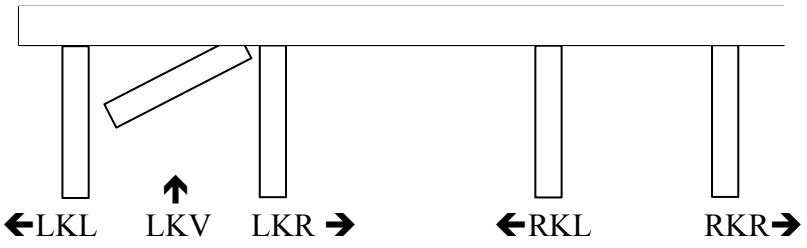

Figure 3-9. Diagram of pedal steel knee levers, from the player's perspective.

[13] Non-professionals are generally more likely to employ setups that are either standard to a manufacturer or based on those of a prominent professional player.

[14] The use of a lever activated by the right knee moving vertically is avoided due to the right foot being used to control a volume pedal that is sensitive to vertical motion.

Like the A and B pedals, several of the knee lever changes are standardized. These include raising strings 4 and 8 one half step, lowering the same strings one half step, and lowering string 2 either a half step or a whole step. Strings 4 and 8 are generally lowered by LKL, and string 2 is usually lowered is usually lowered by RKR. Most players lower 4 and 8 with LKR, but others favor RKL to facilitate the combination of the B pedal and the lowered 4 or 8 (a common execution of a dominant seventh chord). The remaining knee levers are open to the needs of the individual player. Auldridge, for example, uses LKR to lower string 5 one half step, giving him easy access to a secondary dominant as well as a melodic ornament that is a hallmark of his playing. Charleton, on the other hand, forgoes raising 4 and 8 in favor of lowering string 9 a half step on LKL. Used in combination with the B pedal, this change provides a first inversion major triad with an option of a 4-3 suspension in the bass.[15]

The pitch-changing devices of the pedal steel offer the clearest view of the particular symbiosis between the instrument itself and each player's perception, cognition, and ideation of harmony and melody. Players may begin with a conventional setup and develop a style that conforms to the instrument's traditions, or they may choose to reshape the instrument to match their own predilections. Audridge's choice of knee levers, for example, facilitates access to dominant seventh chords, which are difficult to play with the tuning of his primary instrument, the dobro. By emphasizing the different possibilities of the two instruments, Auldridge ensures that he will approach the instruments with a different musical vocabulary in addition to a different sound. Charleton, conversely, uses his knee levers to produce predominantly triadic chord

[15] Buddy Charleton, interview, Orange, Virginia, 1 August 2009.

changes. This is a marked contrast to the changes of the C6 neck, which are grounded in seventh chords of all varieties. His apparent predilection for a voicing based on his LKL, using strings 4, 6, and 9, however, may indicate another rationale, as this grip, while not common to the E9 vocabulary is a mainstay of C6 technique. Taken this way, Charleton's E9 neck presents a case in which the instrument was altered to match the habits of the player, and, ultimately, musical results that are shaped by the input of the player's body.[16]

Thinking Out the Steel: Ideation and Innovation in the Pre-modern E9

Whereas the modern E9 pedal steel can be approached as a completed technology with its mechanical and musical features integrated into a holistic system, the players who contributed to its evolution in the 1950s, 1960s, and 1970s developed their own distinct instrumental styles in conjunction with their musical knowledge and their professional experiences. Although these ideas were disseminated amongst the steel guitar community through both recordings and personal contact, the players of this generation often produced different solutions to the musical problems posed by the instrument and the demands of their performance contexts. In what follows, I illustrate the variety of the resultant personal scripts through case studies centered on juxtaposition of the recorded output of three key players with their own thoughts about their playing, as expressed in contemporary and retrospective writings and interviews. The first study is of Buddy Emmons, whose career is marked by a sense of restlessness and an exploratory

[16] One of the most extreme examples of the customization of the knee levers is the configuration developed by Jimmie Crawford (1935–2005), whose "Crawford Cluster" expanded the number of E9 knee levers to seven. This was made possible by having two levers on each side of the left knee, one closer to the player and one farther away from the player and slightly closer to the knee. With this arrangement Crawford was able to expand the harmonic language of the E9 beyond the needs of country music, and he specifically cited different genres of music in his rationale for each knee lever. Winnie Winston, ed., *Pedal Steel Guitar: A Manual of Style* (Hendersonville, Tennessee: Pixenbar Music, 1980), 14–15, 42–44.

drive that led him to continually experiment with his musical ideas and the mechanics of his instrument. Second, quintessential session player Lloyd Green provides an example of an approach that asserts the importance of abstract musical thought over the influence of the instrument's technology. Finally, Ralph Mooney's recordings demonstrate an intuitive musical style that evolved in tandem with a series of concrete shifts in instrument technology, while preserving key elements of his personal aesthetics. Running parallel to the broader narrative of the pedal steel's evolution presented in Chapter Two, these case studies offer a means to account for the variances in individual experiences, creativity, and influence that render music as an art form instead of a mechanical process.

Buddy Emmons: American Experimentalist

Born 27 January 1937 in Mishawaka, Indiana, Emmons began playing steel guitar at the urging of his father when he was 11 years old.[17] As an initiate into the world of the instrument in 1948, Emmons began like many of his contemporaries, with a six-string lap steel tuned to an open major tuning. After a brief period of lessons at the "Hawaiian Conservatory of Music" in nearby South Bend, he shifted his focus from the Hawaiian style to the country pop style exemplified by Little Roy Wiggins on the recordings of Eddy Arnold.[18] He soon discovered the Western swing style and the C6 tuning from Jerry Byrd records and radio broadcasts of fellow Mishawaka native Herb Remington, who

[17] Biographical information is drawn from Buddy Emmons, "Pedal Steel King [as told to Tom Bradshaw]," *Guitar Player* 10, no. 5 (May 1976): 16, 32, 34, 36, 38, 40, 44, 46, 48, 50; Harry Morrow, "Buddy Emmons: Adventures with the Wild Man of Steel," *Country Music* 6, no.7 (April 1978): 53–54. Ernie Renn, ed., "Buddy Emmons Q&A."

[18] Renn, "Buddy Emmons Q&A."

played with Bob Wills's Texas Playboys in the late 1940s.[19] By age 15, Emmons began playing professionally, and dropped out of high school at sixteen to pursue a full-time career as a musician.

Emmons's first move was to Calumet City, Illinois, where he began playing eight hours a night, six nights a week. His first guitar had long been replaced by a double-eight-string National, and in 1952 he upgraded again to a triple-neck Fender, one of the best instruments available at the time. That same year, however, he learned of the custom Bigsby pedal steel played by his idol Speedy West, and he immediately ordered one for himself. Emmons soon had his first in-person exposure to pedal steels, playing several experimental models in a visit to the Chicago workshop of designer Herbert Hise. Although he couldn't afford one of Hise's pedal steels, he did have a three-tuning cam changer installed on one neck of his Fender.[20]

By 1954, Emmons had relocated again, this time to Detroit, and early that year, while still waiting for his Bigsby, Emmons heard "Slowly." He quickly called Bigsby to ensure that his instrument was set up to play the Isaacs change. The instrument he received had three eight-string necks: one tuned to E9 with Issacs's pedals, one an E6 with its B strings lowered by a third pedal to A#, and one tuned to C6. Shortly after receiving his Bigsby, Emmons got his first big break, taking Walter Haynes's seat in Little Jimmy Dickens's band. He had already worked for several high-profile artists, including singer Carl Smith, who had brought word of the young player's prowess back to Nashville. When Dickens brought Emmons to Nashville in July 1955, he immediately

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[19] Bradshaw, "Pedal Steel King," 44.

[20] Bradshaw, "Pedal Steel King," 34. See Figure 1-5.

immersed himself in the scene. His abilities were immediately recognized—so much that he received a recording contract from Columbia Records while still only nineteen years old.

Emmons's first instrumental recordings in Nashville were with the other members of the Dickens band, recording first under the name of the "Country Boys," and later under his own name. These tracks included "Raisin' the Dickens," a Speedy West/Jimmy Bryant-esque steel guitar/electric guitar duet, and "Four Wheel Drive," a virtuosic showpiece for the C6 tuning. Both of these tunes are canonical recordings in the steel guitar repertory, and are still played and recorded by players today.

Among Emmons's earliest recording sessions with singers were a series of dates with Faron Young, then an up-and-coming artist whose first number one single, "Live Fast, Love Hard, Die Young," had been released the previous year. As detailed in Chapter Two, Emmons's subsequent exploration of the emerging pedal steel is documented through his groundbreaking work on recordings by Ernest Tubb and Ray Price, whose bands were central to his activities from 1957 to 1967. Throughout this period, his drive to push the technological and musical boundaries of his instrument was paralleled by a lifestyle of extremes, including a pattern of substance abuse that interfered with the more mundane aspects of being a professional musician in Nashville.

As Emmons recounts, by 1967, his personal life and professional reputation had suffered to the point that he could not carry on as he had been: "I couldn't get work for one thing. My wildness had peaked. I guess everybody had caught my act. I missed sessions, and I was having troubles at home with my second wife."[21] The impetus for a

[21] Morrow, 55.

major change came with an offer from singer Roger Miller to join his touring band not on steel, but on bass. In conjunction with this new gig, Emmons left Nashville for Los Angeles, where he cleaned up his lifestyle, and played pedal steel on recordings of a diverse range of artists, including Ray Charles, the Carpenters, Nancy Sinatra, and Judy Collins.

In 1974, Emmons returned to Nashville sober and relatively sedate, intending to devote himself to full-time studio work on the by then ubiquitous E9 neck. This circumscribed musical existence proved to be short-lived, however, as exposure to the recordings of virtuoso jazz guitarist Pat Martino led Emmons back to the C6 neck in the late 1970s, and a series of jazz-centered projects, including collaborations with swing fiddler Buddy Spicher, guitarist Lenny Breau, and guitarist Danny Gatton (as the Redneck Jazz Explosion). Throughout the 1980s and 1990s, Emmons maintained a presence in both the studio and live performances, recording with stars such as Gene Watson, Ricky Skaggs, and George Strait, and touring with the Everly Brothers. Effectively retired since the early 2000s, Emmons has appeared on a select number of high profile recordings and made appearances at steel guitar shows and conventions.

Throughout his career, Emmons's restlessness and exploratory drive have led him to continually search for innovations of both his musical ideas and the mechanics of his instrument. His process of ideation is an exemplar of the co-constructive relationship between an instrument in the process of evolution and the development of musical thought. This relationship is illustrated by evidence from across his career, including both key recordings and statements made in interviews and writings.

Like most of his contemporaries, Emmons learned to play his instrument in the context of practical music making rather than any kind of formal study. As he explains his early career, "I knew I could play, but I knew I didn't know a whole lot about music."[22] His experiments with the pedal steel thus not only reflected the embodied knowledge gained through countless hours of practice and performance, but also shaped his music-theoretical knowledge as he grew as a performer. As a musician, his approach to the instrument was driven not by the abstract ideas about ease of use or even musical potentialities that are found in many of the patents discussed above, but by the pursuit of self-expression. The barriers that he encountered were similar to those familiar to any composer, player, writer, or artist who attempts to translate their vision into a physical realization of sound or matter. Because Emmons's work was so closely tied to a technological object, the issues that he had to overcome could be pinpointed in terms of the pedal steel's form and function: "I've always had a certain amount of contempt for it because of its physical drawbacks. I've never been able to completely express myself musically due to the limitations of fixed-pedal configurations."[23] In other words, the need to build specific functions into the pedal steel's design in order for it to function meant that only a few of its many potential musical features could be available at any given time, without completely altering the setup.

The history of Emmons's configuration, therefore, can be read as a history of a decision-making process through which he determined the most important musical functions to be enabled by his pedal steel's mechanics. One way that players maximize

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[22] Morrow, 54.

[23] Jimmy Phillips, "Masters of the Pedal Steel," *Peavey Monitor* 15, no. 3 (1996): 37–38.

their options is to continue the steel guitar tradition of having two separate necks, each with its own tuning and pedal functions. Influenced in no small part by Emmons, these tunings are almost exclusively E9 and C6. In Emmons's hands, these two tunings became associated with the two distinct styles that led to their modern vernacular descriptions: the "jazz" neck (C6) and the "money" neck (E9). The C6 neck was the site for both the continuance of the Western swing tradition, as well as for Emmons's engagement with the language of more mainstream jazz styles, including big band, bebop, and post-bop. The E9 neck, as I have discussed, remained most closely associated with the studio-centered world of mainstream country, with its varyingly pop-inflected leanings towards a more diatonic melodic and harmonic vocabulary. In what follows, I will more closely examine Emmons's conception of the E9 tuning, beginning with the early experiments that set the stage for the major developments discussed in Chapter Two, and moving on to recordings he made in the early 1970s, which display a relatively stable setup that both reflects his mature musical language and helped to define the sound and functionality of the instrument as it is known today.

Unlike many players of the 1950s, who tell of their attempts to re-create the sound of "Slowly" through their own homemade mechanisms, Emmons sought to replicate Isaacs's style without the use of pedals.[24] He did this by rearranging the order of the strings of a normal A major tuning and using a bar slant to move from a root position major triad to a first inversion major triad with the root a fifth above (see Figure 3-10).

[24] Renn, "Buddy Emmons Q&A." Emmons provides a date of 1955, but discographical information places its release in September 1954, which better aligns with the timeline provided in other accounts of his instrument history.

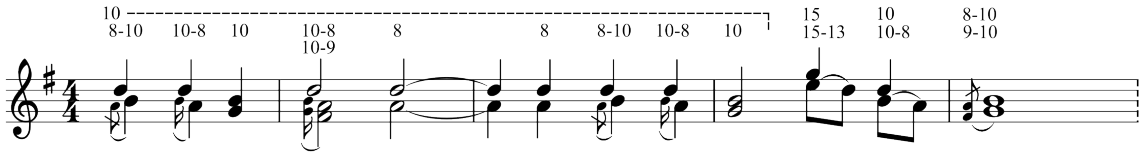

Figure 3-10. Casey Clark's Lazy Ranch Boys (with Jimmy Work), "Makin' Believe" (rec. 1954), steel guitar solo by Buddy Emmons [0:00–0:09].

Although it is of course possible to play notes appropriate to this chord change without reconfiguring the strings, Emmons's experiment allowed him to reproduce the exact voicing of Isaacs's pedal—most importantly, the static common tone on the top of both triads. The reverse slant required to achieve this harmonic gesture took the place of the Isaacs pedal, but inverted the voicings achieved by the unaffected tuning and the pitch-changing effect. This bit of mental gymnastics demonstrates Emmons's intuitive understanding of the theoretical issues at hand; that he went as far as to incorporate an empty string position to facilitate the intonation of the slant shows his willingness to make unconventional choices in order to achieve his intended results (see Figure 3-11).

Fret	0	8	9	10
String 1	E	C	C#	D
(String 2)	-	-	-	-
String 3	A	F	F#	G
String 4	C#	A	A#	B

Figure 3-11. Tuning and configuration of Emmons's guitar for Figure 3-10, showing the orientation of the bar in normal and slanted positions.

After receiving his first pedal steel, Emmons capitalized on the technologically enabled automation of these types of figures to expand on the musical possibilities suggested by Isaacs playing. In his first session with Faron Young, for example, Emmons provided an introduction for the song, "Sweet Dreams" (a future number two single) that

shows off his use of the Isaacs pedal. As show in Figure 3-12, Emmons's introduction to the track closely echoes the aesthetics of "Slowly," but uses the pedal to move through the chord changes in a descending rather than an ascending pattern.

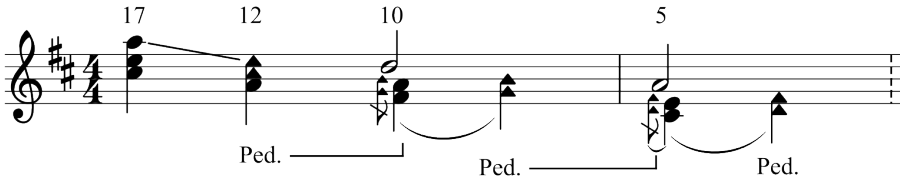

Figure 3-12. Faron Young, "Sweet Dreams" (rec. 1956), pedal steel introduction by Buddy Emmons [0:00–0:06].

Over the next several years, Emmons developed his own virtuosic style of pedal playing, fearlessly probing the musical, timbral, and practical aspects of his instrument through a series of physical alterations: "Just about every week, I'd come up with some kind of change. I'd take a metal neck off and replace it with wood to see if that would help the tone. I had a neck without a fretboard; that was to keep other people from playing it. I had the only guitar in town with an ashtray on it."[25] Like Alvino Rey, Speedy West, and other early pedal players, Emmons at times obfuscated his tinkering and his techniques by placing a panel across the front of his instrument or by removing the fretboard of a neck, rendering it unplayable by most other players, who relied on the visual guidance that it provided. His concern for the practicality of having a built-in ashtray reflects a concern for the maintenance of his instruments under the conditions of live playing, which did not allow for cigarette breaks away from the bandstand; this concern would resurface in the design of the Emmons pedal steel, with its burn-resistant mica finish. In a way, many of Emmons's pursuits were akin to other forms of unguided

[25] Morrow, 54.

scientific research—he was not necessarily attempting to achieve a specific goal, but rather investigating the untapped potential of the instrument, and following where the results let him. As a performer, he took as his highest mark of success the approval of both listeners and other musicians: “If you get it on record and it makes a jaw drop, it’s been worthwhile.”

As discussed in Chapter 2, Emmons’s musical statements in the late 1950s and early 1960s did indeed cause many jaws to drop, and secured his reputation as the leading practitioner of the pedal steel. His ability to manipulate the instrument’s mechanics led to his collaboration with Shot Jackson and the formation of the Sho~Bud steel guitar company in 1956. Their early efforts built on the innovations of Paul Bigsby’s designs, and reinforced the morphology and visual aesthetics that began to define the instrument, including parts made of figured hardwoods and polished aluminum, the staggered alignment of the necks, and the front-mounted pedal bar. However, Emmons's spirit of continual experimentation led to conflicts with Jackson and his departure from the company to form his own eponymous company in the early 1960s.

The tenets of Emmons's design present an embodiment of his vision for the instrument’s musical potential as well as for its image. With a streamlined shape and its wooden parts covered in an outer layer of shiny, black mica, the original Emmons steel offered a sleek, modern alternative to the more traditional woodgrain finish of the Sho~Bud. This “progressive” image was bolstered by the fretboard position markers, which were atomic symbols rather than the old-fashioned playing card graphics. In terms of musical functionality, Emmons’s pitch-changing mechanisms presented his solution to the problem of Sho~Bud's “permanent” system, in which the changes were hard-wired

into the design and required significant modifications in order to change the instrument's setup (see the history of the re-entrant strings in Chapter Two). Like the Fender design, this system allowed for each string to be both raised and lowered in pitch, a major step forward in functionality. Although sacrificing the user-friendliness of the Fender cable system for increased stability and sustain, as well as a tone closer to the Bigsby and Sho~Bud designs, the Emmons enabled the savvy player to reconfigure their instrument. In addition to the musical aspects of the design, Emmons also introduced a stereo pickup configuration, which reflected his engagement with the electronic side of the instrument's tone production.

As the advances of the Emmons design propelled the addition of more pitch-changing devices, especially the knee levers that would prove essential to the standard ten-string E9 tuning, Emmons refined the elements of his personal musical style. The most complete picture of Emmons's innovations in this period can be heard on the album entitled *Emmons Guitar Company, Inc.*, recorded ca. 1970, and released as a promotional album for the manufacturer.[26] Commonly referred to as the "*Black Album*" (for its two-tone packaging), this collection is one of the most central texts in the canon of steel guitar recordings. The tracks on the Black Album include several original compositions by Emmons (including a new recording of his 1956 tune "Raisin' the Dickens"), as well as instrumental arrangements of well-known songs such as "Greensleeves" and "Danny Boy." Emmons's respective uses of the E9 and C6 necks on the *Black Album* reflect his and many other steel players' conceptions of these two halves of the instrument. Emmons favors the C6 neck for single-line melodies, particularly when improvising, as well as

[26] Buddy Emmons, *Emmons Steel Guitar Company, Inc.*, ELP-1001, ca. 1971.

chords of more than four notes—predominantly extended tertian structures, and often strummed—highlighting that tuning's connection to the older chord-based conception of the pedals. On the E9 neck, Emmons plays ballads and primarily works in two- and three-voice harmony. Particularly through his rendition of "Danny Boy," Emmons offers a manifesto of the art of the E9 pedal steel, showcasing the entire range of harmonic and melodic effects developed over the previous fifteen years, displaying them not as merely as ornamentation, but as integral components of unique and highly refined instrumental idiom.[27]

A major aspect of Emmons's E9 style is his playing of long, legato melodies on one string, paired with a harmony part on a second string. For example, with the A pedal and the E and F knee levers, the perfect fifth of the unaltered strings 5 and 8 (E3 and B3) can be changed to a tritone, a minor sixth, a major sixth, or a minor seventh. By combining these manipulations with movement up and down the fretboard, Emmons furthered the essential pedal steel aesthetic of smoothly changing harmonies with minimal articulation.

A quintessential example of this aesthetic is the melody of Emmons's composition, "Blue Jade." Played on strings 5 and 6, the opening melody of "Blue Jade" begins with an A-C dyad at the first fret, ascending over the course of six beats to the same notes one octave higher at the thirteenth. Along the way the minor third of the unaltered strings undergoes a sequence of intervallic transformations, first to a major

[27] Emmons's experimentation did not take place solely in the pitch-changing devices and tuning of the steel guitar, but also in the development of electronic effects and both in live performance and in the studio: "I always look for new effects to use with the steel…effects have gotten me session that would not have been available had I been a "pure" steel player….I think the steel guitar is the best driver for effects of any instrument I know." Tom Bradshaw, "An Interview with Buddy Emmons," *Steel Guitarist* (May 1979): 9.

second, then a perfect fourth, minor third, major third, perfect fourth, and back to a minor third (see Figure 3-13). The melody then descends back to the first fret through a sequential figure moving through multiple positions of the F and B-flat triads before finishing with a final gesture on strings 5 and 8.

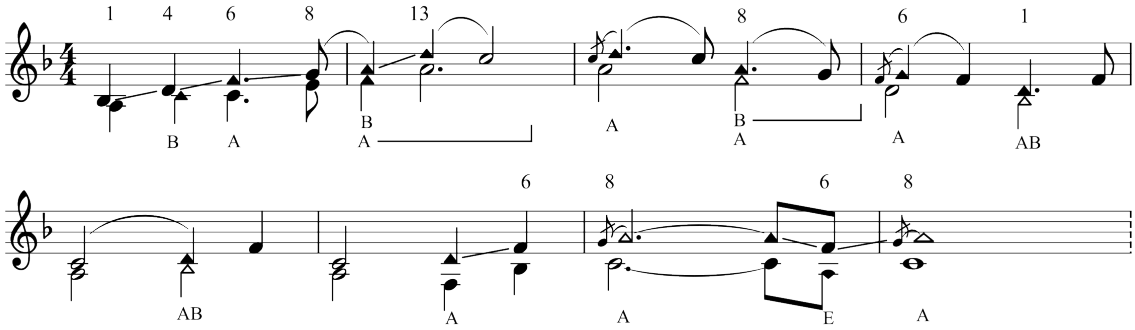

Figure 3-13. Buddy Emmons, "Blue Jade" (rec. ca. 1970), opening pedal steel melody [00:12–00:34].

Whereas each of these intervals could be executed in numerous places on the pedal steel's fingerboard, Emmons's gesture demonstrates how the permutations available through his setup flow from the primary no-pedal and pedals-down positions of the F major triads/key areas. A reductive analysis of this melodic fragment of "Blue Jade" could see the entire passage as a series of ornamentations of the F chord, encircling the first, eighth, and thirteenth frets.

On "Danny Boy," Emmons uses the full gamut of his pedals and knee levers both to further the transformation of established techniques and gestures, and to create new harmonic expressions rooted in a dialogue between musical ideas and the instrument's embedded possibilities. Also set in F major, the main sections of the tune's melody are centered on the key's home positions of the first, eighth, and thirteenth frets, and make typical use of the A and B pedals. Among the familiar figurations from Emmons's prior

recordings are his signature contrapuntal gesture unfolds from a doubled unison note (2:08–2:13) and an organ-like cadential pattern encircling the third of the F triad (0:50–0:56), both of which recall his introduction to Ray Price's "The Healing Hands of Time" (Example 2-16). The latter of these showcases one of Emmons's latest additions to his setup—the knee lever that lowers string 6 one whole step (see Figure 3-14).

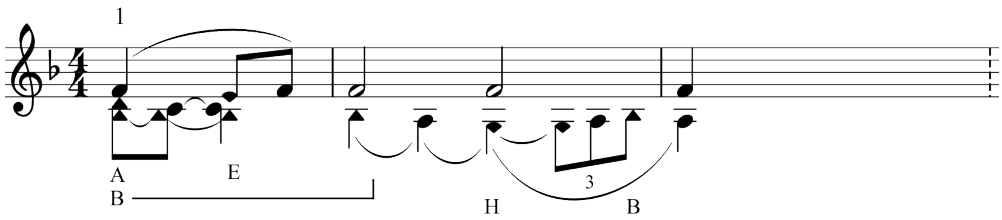

Figure 3-14. Buddy Emmons, "Danny Boy" (ca. 1970), cadential figure [0:50–0:56].

In other passages, particularly in transitions between phrases and buildups to climactic moments, Emmons's gestures display a harmonic language that is an amalgamation of his engagement with the extended chordal vocabulary of jazz and his exploitation of the idiosyncratic features of the instrument itself. At the end of the first phrase, for example (0:24-0:31), he arrives at a two-measure half cadence that features a G7 chord resolving to a C9 by walking down two frets, all the while retaining a common G by activating the A pedal halfway and then fully (see Figure 3-15, m. 1).

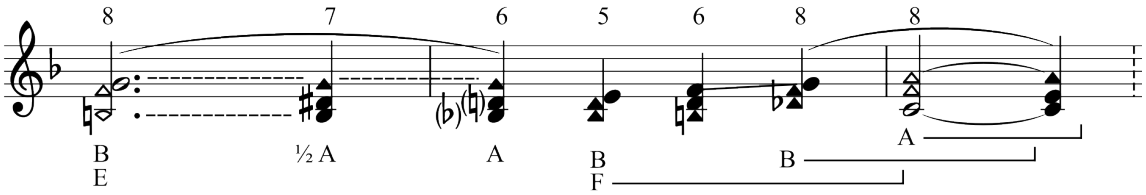

Figure 3-15. Buddy Emmons, "Danny Boy" (ca. 1970), cadence and transition [0:24–0:31].

This is followed by a unique harmonization of the pickup notes E-F-G leading into the F major triad with A on top (Figure 3-15, mm. 2–3). The harmonies of the pickup make the most musical sense when considered as the best (or perhaps the most interesting) possibilities that allowed Emmons to walk up to the F triad without re-articulation, while ensuring the presence of the crucial inner voice on the sixth string.

A final example of the pedal steel–specific language displayed in this arrangement comes in the parallel transitional passage leading up to the final statement of the melody (2:18–2:27). Here, Emmons exploits the parallel between the symmetry of intervals across the string plane and the symmetrical nature of diminished seventh chords and augmented triads (see 3-16).

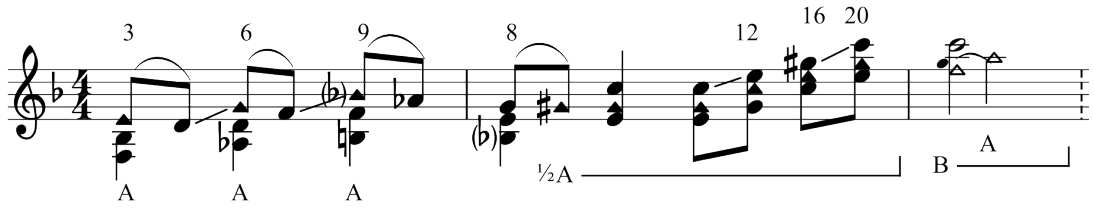

Figure 3-16. Buddy Emmons, "Danny Boy," transition [2:18–2:27].

First, he plays the diminished triad (B-D-F) embedded in the G7 chord, playing it in second inversion at the third fret, ornamented by application of the A pedal (creating an appoggiatura from E-D). He moves this same figure up three frets (three half-steps) to A-flat–D–F and again to B–F–Ab.[28] Moving back one fret to play the B-flat–E–G of the C7 chord, he quickly raises the A pedal halfway to raise the G to G#, and then switches string groups to play a first inversion C augmented triad, which he then transposes up three times by four-fret (major third) intervals, landing on the twentieth fret, where he

[28] This harmony could thus be interpreted as a diminished seventh chord on B or a G7b9.

fully actives the A and B pedals to play the F major triad beginning the final melodic phrase. In sum, this short transitional phrase demonstrates Emmons's sophisticated juxtaposition of the physical attributes of the pedal steel with music theoretical ideas drawn from multiples styles and genres.

As seen through these definitive moments in his career, Buddy Emmons's musical language on the E9 pedal steel reflects the intersections of musical knowledge and knowledge centered in the experience of playing an instrument. The flow of ideas presented in his recordings displays a dialogue in which he positioned his musical ideas over the performance practices that he was ostensibly beholden to as a player of a "country" instrument, and developed theoretical ideas in tandem with the mechanics of the pedal steel. Emmons's "Danny Boy" is a tour-de-force not because of its difficulty, but for the way in which Emmons fully transformed his engagement with the possibilities offered by the instrument's mechanical processes to a totally integrated technological-musical idiom. Although the *Black Album* presents a definitive moment in Emmons's development, and exerted a heavy influence on pedal steel playing writ large, Emmons himself remained open to further adaptations, summing up his views on the necessary balance between innovation and utility by saying, "Anything new is important to me and worth considering, and that goes beyond music…I always consider new pedal changes, but never have changed my setup for the sake of one session."[29]

[29] Bradshaw, "Interview with Buddy Emmons," 9.

Lloyd Green: "Mr. Nashville Sound"

Born just ten months after Emmons, Lloyd Green presents both a significantly divergent career path and attitude towards the pedal steel. Born in Leaf, Mississippi, in October 1937, Green moved with his family to Mobile, Alabama, in 1941.[30] Like Emmons, Green began learning lap steel in the Hawaiian tradition at an early age, and quickly outgrew the capabilities of his teacher at the local Oahu School of Music. Although he completed the course materials available through his lessons, he was more engaged by the playing he heard on the radio, particularly that of Little Roy Wiggins and Jerry Byrd. While still a pre-teen, Green began performing in clubs and dance halls, sitting in with touring artists such as Justin Tubb, The Wilburn Brothers, and Hank Lockin. In 1956, after completing high school and attending several years of college, Green decided to move to Nashville to try to get the urge to play professionally "out of his system." His early career in the Nashville scene lasted until 1961, during which time he toured with Faron Young, recorded with George Jones, and graduated from a Fender with a homemade pedal to a Bigsby owned by Young, and finally a Rickenbacker double-neck with two pedals added by Shot Jackson. Despite working with stars like Ferlin Husky, Jean Sheppard, and Patsy Cline, Green's financial situation forced him to drop out of the musical world in 1961 to work as a shoe salesman, eventually moving to Little Rock, Arkansas for a position in management. After two years without playing his steel, however, Green returned to Nashville determined to find better success as a player.

[30] Biographical information drawn from Lloyd Green, interview by Douglas B. Green, 12 October 1973, interview OHC65-LC, transcript, Country Music Foundation Oral History Project, Country Music Hall of Fame and Museum, Nashville, Tennessee; Douglas Green, "Lloyd Green: Nashville's Busiest," *Guitar Player* 8, no. 8 (August 1978): 16, 36–38; Rich Kienzle, "Lloyd Green: From the 'A Team' to Americana," *Vintage Guitar* 22, no. 11 (September 2008), reprinted online http://www.vintageguitar.com/3683/lloyd-green/

After returning to Nashville, Green found an inroad back to music through employment at the just-opened Nashville office of the music licensing company SESAC under the management of singer, songwriter, and producer Roy Drusky. Green soon added employment as a session player for Chart Records, where he played for demo sessions and on recordings by up-and-coming singers such as Lynn Anderson. While at Chart, Green also recorded the first of over a dozen solo albums that he would release during his career. Among the demo sessions he recorded was a the song for singer Warner Mack, who hired Green to play for the session for a new song, "The Bridge Washed Out," despite the preference of producer Owen Bradley for Pete Drake. After the success of the single, Green's career as a session musician began in earnest. Over the following decades, Green is credited with playing on over 10,000 recording sessions, including 115 number one singles, and over 100 songs in the top ten.[31] Several of these hit recordings, including "The Bridge Washed Out" (1965) and Tammy Wynette's "D-I-V-O-R-C-E" (1968), are well established in pedal steel lore as the sources of Green's contributions to the standard vocabulary of pitch-changing pedals and knee levers. As discussed in Chapter Two, Green also provided an essential musical element for the Byrds' quintessential 1968 country-rock album *Sweetheart of the Rodeo*. Among the more than 560 artists with whom Green recorded are country artists such as Johnny Paycheck, Charlie Pride, the Oak Ridge Boys, Crystal Gayle, Dolly Parton, and Alan Jackson, as well as pop and folk artists such as Joan Baez, Bob Dylan, Paul McCartney, and the Pointer Sisters. Green's solo albums feature both original compositions and instrumental arrangements of contemporary country and pop hits; his 1973 version of "I

[31] A discography compiled with Green's cooperation can be found at Walter Stettner, ed. *Lloyd Green Tribute*, www.lloydgreentribute.com.

Can See Clearly Now" reached #36 on the US Country Charts. After a period of retirement due to hearing issues beginning in 1988, Green is now active again as a session player, and recorded a solo album entitled *Revisited* in 2003.

As ubiquitous and universally admired as Green's playing is, he is in many ways a different type of musician than the other steel guitar innovators. In addition to his prolific output of recordings, he is also highly articulate and outspoken about his musical thought process. One of the key tenets of Green's pedal steel ideation is that he views the instrument as subordinate to the creativity and imagination of the performer. In Green's view, true musicianship is thus separable from technical proficiency:

> Learning to play the steel guitar and playing music on the steel are different entities. Only when one has grasped the fundamentals of playing such a remarkably complex instrument can the advent of genuinely playing music begin. Just learning to play the steel as a mechanical or technical function isn't enough, unless one is content to only copy others and play generic licks. Spending a career simply pushing pedals and striking strings, then describing that as playing steel guitar, strikes me as emotionally unrewarding and naïve.[32]

Part of Green's unique style and sound derives from his avoidance of imitating other players, seeking to ensure that his own ideas would be fresh and unduplicated.[33] This attitude reflects both an ethos of personal expression and a shrewdly utilitarian reading of the aesthetic concerns of the Nashville recording industry. Green's consummate professionalism manifested in not only his ability to create new sounds, but also his willingness to tailor his playing to the needs of his employers—an attitude that

[32] Phillips, "Masters of the Pedal Steel," 39.

[33] Phillips, "Masters of the Pedal Steel," 36–37.

naturally led him to a different career path than Emmons. As Green explained in a 1973 interview:

> Quite often the song is the indicator; certain lyrics suggest certain textures or colorings. Another prime factor is the way the melody slants, and the way the singer phrases the lyrics… I was able to be chameleon-like in my approach. I've had a number of totally different styles: Billy Sanford and I did all those early Johnny Paycheck records, playing all those fancy, out-of-sight licks that just knocked me out. I had a unique style for Warner Mack. I'm not saying whether it was good or bad, but at least it was different. Then Charlie Pride came along. He has a mellow, full voice, and so I started getting away from the harsh, treble sound, and setting the controls on my amplifier to get a more listenable sound that wasn't so hard and hillbilly.[34]

Just as important as the high value Green placed on the demands of the recording industry, however, is the way in which he shaped his own musical ideas through precise control of the mechanical features of his instrument. One of Green's most important contributions to the history of the pedal steel is his embrace of a single neck E9 pedal steel in the early 1970s. Having found that he only played his C6 neck on a small number of recordings, he decided to reduce the weight of his instrument and thus reduce the amount of maintenance needed and the number of strings that he had to tune.[35] To this end, he removed the strings, mechanisms, and fretboard of the back neck and covered it with a padded armrest. This model, generically known as the SD-10, was later manufactured by Sho~Bud as the LDG model (with the "D" standing for Green's wife, Dot).

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[34] Lloyd Green, interview OHC65-LC. Green's use of "hillbilly" here reflects a similar concern to the producers of the early "Nashville Sound" recordings, and reflects the persistent dichotomy of what Peterson defines as the "hard core" and "soft shell" styles of country. See Peterson, *Creating Country Music*, 137–39.

[35] Green, "Lloyd Green," 36.

The very notion that one could be a pedal steel player and only play the E9 neck, rather than needing expertise on both necks, was an important step in the solidification of the instrument's identity. Although Green's move was a reaction to his practical assessment of the priorities of the Nashville recording industry in the early 1970s, it also had powerful ramifications on the future of the instrument. As I discuss in Chapter Four, this propelled the market for single-neck E9 pedal steels in the amateur market, and further removed the sound of the C6 pedal steel from mainstream country and other popular music.

In addition to reducing the instrument to one neck, Green's general attitude towards the setup of the pedal steel combines aspects of both a music theoretical approach and a philosophical stance:

> I would suggest that a steel player decide on which pedal setup and tuning he/she is most comfortable with and stick with it. There's an entire lifetime of knowledge and ideas waiting to be played. Keep in mind that mathematically, there are hundreds of thousands of combinations using the pedals, strings, bar positions, and phrasings. It is in fact an entire musical language. Most can't grasp or learn more than a fraction of this language if they're constantly changing pedal setups or tunings.[36]

Establishing his instrument as an embodiment of this philosophy, Green restricted the number of his pitch-changing devices to a bare minimum: three pedals and four knee levers. Although this is a fairly typical array of devices for the E9, Green's setup, like that of Ralph Mooney, includes several devices that activate only one string rather than multiples (see Fig. 3-17).

[36] Phillips, "Masters of the Pedal Steel," 39.

	A	B	C	LKL	LKR	RKL	RKR
1-F#				+G			
2-D#						-D/C#	
3-G#		+A					
4-E			+F#		+E#		
5-B	+C#		+C#				
6-G#		+A					
7-F#							
8-E					+E#		-D#
9-D							
10-B	+C#						

Figure 3-17. Lloyd Green's pedal steel setup, ca. 1967.

Among his most significant deviations from the standard E9 setup is the fact that Green does not lower his fourth string to D# sharp. Green initially lowered both E strings with the same knee lever, but removed the change from the fourth string in response to mechanical issues, leading him to work out different means for achieving the increasingly popular features it afforded:

> I removed that change in 1966 because of the inconsistency in pitch return, deciding to be in tune instead. By discarding this change I was forced into finding new ways to simulate the same sound. There are many, including strings 2 & 5, 4 & 5 (with the E-F lever), bar slants and a number of other replacements. I never once missed the change and, indeed, found many new voicings which add a wider, deeper resonance to the tonal range.[37]

Shortly after eliminating that change, Green "discovered" the E-E# knee lever, which he showcased on Tammy Wynette's "D-I-V-O-R-C-E" in 1967 (see Chapter 2). With the addition of this change, Green had "an awareness that I now had a complete mathematical pedal set-up and tuning with which I should be able to play anything I could conceive. It was simply a case of learning the language now accessible instead of

[37] Green to Joey Ace, 9 May 2005, http://steelguitarforum.com/Forum15/HTML/009217.html

changing or modifying the set-up (language) with the many pedal variations that came along."[38] All of Green's "mathematical" computations were done outside of his studio work, however, and part of his decision to restrain from further experimentation was the sheer volume and breakneck speed of his life in the recording studio.[39] This pace meant that his musical "language" needed to grounded in the idioms of his performance contexts, and that the mechanics of the pedal steel needed to be a secondary concerns. This entailed a shift towards a fluency of ideas and technique analogous to the point in the process of learning a second language when the speaker formulates original thought in the target language instead of translating from one to the other. Although the functionality of Green's mechanisms did not change after 1966, his musical ideas continued to evolve in dialogue with changes in both the prevailing aesthetics of the recording industry (both within country and outside of the genre) and the specific sonic qualities of his instruments. A survey of just a few selected examples from across Green's career demonstrates how he capitalized on the strengths of his equipment and the musical elements that proved successful.

A video example from Green's first years in Nashville provides a glimpse at his engagement with the styles of Isaacs and Emmons, as well as his own developing dialogue between the pedals and bar slant techniques. In this shortened version of Faron Young's "Sweet Dreams," performed live on the *Country Style U.S.A.* television program in 1957, a fresh-faced Green can be seen playing the triple-neck Bigsby owned by Young

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[38] Ibid.

[39] As Green describes, "I never see the steel when I sit down. All I had to do was think about how to get ideas. How do I fit this into the song? If I had to think about all that stuff on an intellectual level, I couldn't have done it, because I was working three or four sessions every day. And I worked sessions for 25 years, sometimes seven days a week." Kienzle, "Lloyd Green."

for his steel players.[40] Following the practice of most road players, Green duplicates some material from the single's recording, which in this case featured Buddy Emmons (see Ex. 3-12 above). This includes the pedal-centered, "Slowly"-in-reverse introduction and a cadential pattern in the chorus that uses a forward bar slant to play a plagal cadence from G major to D major, with a chromatic passing tone between the B and A on the bottom of the voicing. (see Figure 3-18).

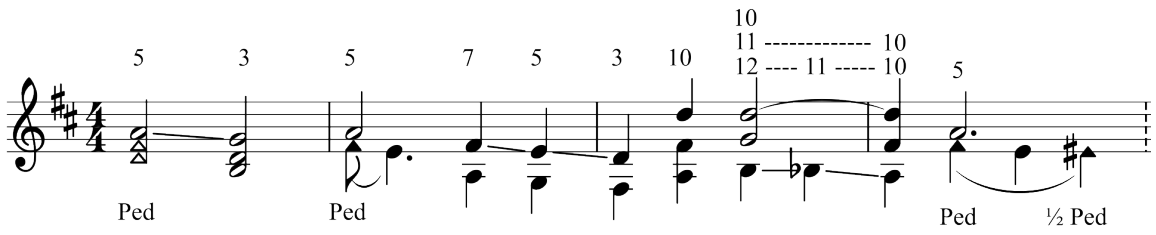

Figure 3-18. Faron Young, "Sweet Dreams" (rec. ca. 1957), pedal steel accompaniment by Lloyd Green [0:29–0:36].

Green's own additions to the arrangement include the passage leading up to this cadence, in which he employs a reverse slant to resolve a perfect fifth between G and D to the F#-D minor sixth of the tonic triad—a gesture that presages the knee lever lowering the eighth string of the later E9 from E to D#. Green also ends the passage with the substitution of an augmented A major triad via a half-pressed pedaled in place of the parallel minor third walkup used in the same transition by Emmons.

Upon his return to Nashville in 1963, Green acquired a Bigsby of his own, which he used on some of his earliest studio recordings, including the session for Warner Mack's "The Bridge Washed Out." A number one single in 1965, "Bridge" propelled Green to greater recognition as a player due to the purposefully different sound aesthetic

[40] Faron Young, "Sweet Dreams," live performance on *Country Style, U.S.A.*, 1957, on *Country Style, U.S.A.*, season 1 (1957), Bear Family BVD 20111, 2007.

that he employed. This sound was the result of several components: the sharp timbre created by a particularly treble-heavy amplifier setting (generating the tone that Green calls “hillbilly”); a right-hand blocking technique similar to the “bounce” of Mooney’s playing; and the pronounced use of the C pedal (raising the upper B and E strings), both melodically (also echoing Mooney) and in combination with the B pedal (raising the high G# to A). As shown in Figure 3-19, Green’s solo in the middle of the track echoes Mooney’s playing in several aspects, particularly the descending figure in the second measure and the flattened thirds near the end. However, Green’s playing is more deliberate than Mooney’s, emphasizing precision through his blocking and uniformity of rhythm. His chromatic inflections of the implied added sixth chord of the B and C pedals became one of his signature stylistic markers, as well as the sharp articulation of his individual melodic lines.

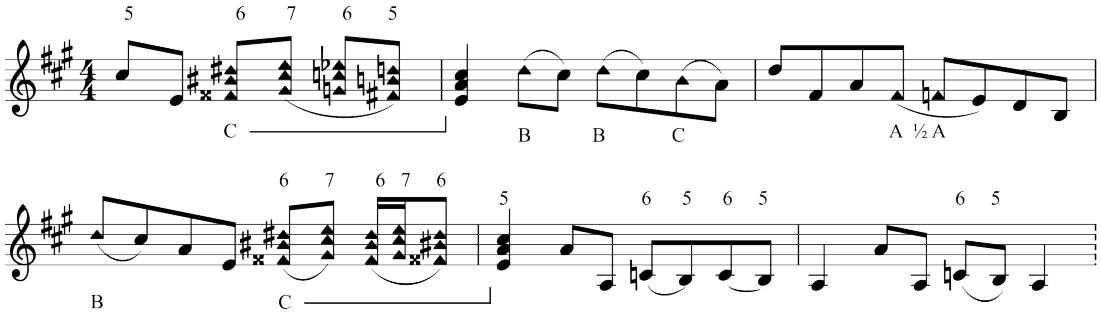

Figure 3-19. Warner Mack, “The Bridge Washed Out” (rec. 1965), pedal steel solo by Lloyd Green [1:02–1:11].

As Green garnered more work in the late 1960s, he found himself struggling with the limitations of his instrument, and switched from his Bigsby to a series of Sho~Buds that would be indispensable to honing his sound and style. The main issues with his

Bigsby included intonation problems and a propensity for breaking strings.[41] His long-time friendship with Shot Jackson, who had setup his Bigsby for him, led to the acquisition of his first Sho~Bud in 1965.[42] Green's second Sho~Bud was a "Fingertip" model that he played from 1967 until 1970, including the sessions for the Byrds' *Sweetheart of the Rodeo* and a string of hits with singer Charlie Pride. This was the period in which Green solidified his setup, and one in which his playing was exposed to more audiences than ever.

Though he is best known for his many studio recordings, one of Green's most highly regarded albums among pedal steel players is a live album that he recorded with singer Charlie Pride in 1968.[43] Green had a long professional relationship with Pride, including both recording work and live performances. In that same period, Green appeared with Pride on the Lawrence Welk show, accompanying him for a performance of his hit single, "Just Between You And Me."[44] That Pride made a point of introducing Green, naming him "one of the great, fine musicians in Nashville," highlighted not only the importance of Green's playing, but also the specific combination of Green's Sho~Bud and his Fender amplifier in reproducing the sound of recordings.

By the mid-1970s, Green became one of the most widely recognized session musicians in Nashville, in part through a series of albums released under his own name beginning in 1964. These included the 1967 album *Mr. Nashville Sound*, the title of which became a popular moniker for Green, demonstrating the fluidity of the perceived

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[41] Kienzle, "Lloyd Green."

[42] Ibid.

[43] Charlie Pride, *In Person* [a.k.a. *Live at Panther Hall*], RCA Victor ANL1-0996, 1969.

[44] http://www.youtube.com/watch?v=nJQdR0ciwYg

meaning of the term, which had once indicated the absence of steel guitar.[45] Green's 1970s albums, coinciding with his adoption of the exclusively E9 pedal steel, illuminate his conception of the instrument as both a continuation of the steel guitar tradition and as a vehicle for exploring contemporary music. Like those released by steel guitarists such as Jimmy Day, Pete Drake, and Hal Rugg, as well as other Nashville session players (including those of pianist Floyd Cramer, guitarists Chet Atkins and Grady Martin, and multi-instrumentalist Charlie McCoy), Green's instrumental albums are comprised of a mix of his instrument's traditional repertory, original compositions, and current popular hits. Though often marketed as "mood music"—the cover art for 1978's *Stainless Steel*, for example, features Green sitting at his steel with a woman, two glasses of wine, and a pair of red roses—Green's albums include a variety of tempos and styles, and a high caliber of musicianship from both Green and his cohort. Like past steel guitar–centered albums aimed at a broader market (such as Elektra's 1971 commercial flop *Suite Steel*[46]), however, Green's albums proved most valuable to steel guitarists, for whom the recordings provided a more complete picture of his playing than his session work for artists.

A statement of Green's belief in the sufficiency of the E9 pedal steel to alone represent the instrument's larger tradition can be heard in his recording of "Steel Guitar Rag," from the 1973 album *Shades of Steel*.[47] In 1964, Green had recorded a fairly

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[45] In the liner notes to a 1993 reissue of the album, Green distances himself from the title, insisting that the album title was merely taken from one of the tracks, not a "supercilious presumption." Lloyd Green, liner notes, *Mr. Nashville Sound*, Double 10 Records 28C-9001, 1993.

[46] [n.a.], "*Suite Steel*: The History of an LP," *Guitar Player* 6, no. 9 (September 1972): 22–23, 38.

[47] Lloyd Green, *Shades of Steel*, Monument KZ32532, 1973.

faithful rendition of the Leon McAuliffe classic, using the C6 neck.[48] This later version, however, was a total reimagining of the tune, both in terms of the steel guitar techniques displayed and its arrangement, which features a light-funk half-time feel and brass hits on the C section. As such, what originated as a piece "about" the open E major tuning (see Chapter One) is now about not only the E9 tuning and pedal setup, but also, through its stark sonic contrast to the 1936 Bob Wills recording, about the 1970s.

In terms of the steel guitar techniques displayed, Green's "Steel Guitar Rag" features his by then familiar crisp articulation, joined to some highly characteristic manipulations of the A and B pedals (see Figure 3-20).

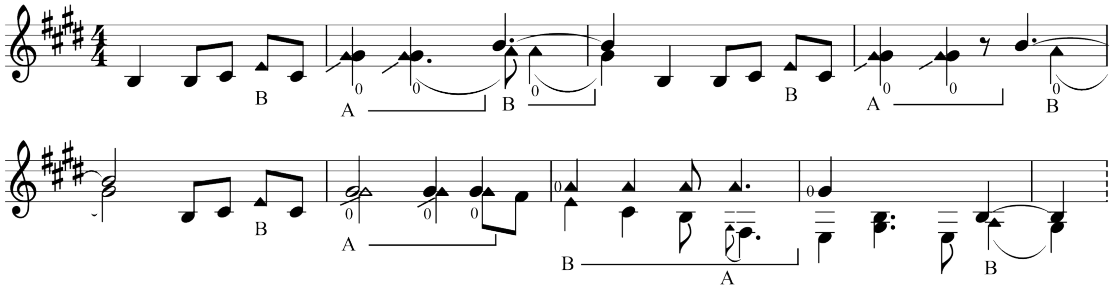

Figure 3-20. Lloyd Green, "Steel Guitar Rag" (rec. 1973), pedal steel melody [0:14–0:28].

A unique aspect of this arrangement is Green's use of the open G# string, with its raise to A, as both a unison doubling and a counterpoint to the melody. The dissonant beats between the not-quite unison pitches of the open and fretted G#s, as well as the suspension figures at the end of the sub-phrases, is a marked departure from the harmonic palette of the original. The second melodic phrase and the bridge are treated much the same, adhering closely enough to the triadic material of the original, but with phrasing and articulation that is unmistakably updated, even without the horn section.

[48] Lloyd Green, *Big Steel Guitar*, Time 2152, 1964.

Green's continued search for novel, commercially viable sounds can be seen in his arrangement of Johnny Nash's 1972 number one single "I Can See Clearly Now," which would give Green his only Top 40 hit, reaching #36 on the U.S. County charts. This track is the first instance of what would become another of Green's signature techniques: playing a melody up and down the neck in octaves on strings 5 and 10, articulating each note with a rapid activation of the A pedal (see Figure 3-21, m. 1–2 and 5–6). Green's inspiration for this technique was jazz guitarist Wes Montgomery, whose playing in octaves was a major influence on jazz guitar technique. The result is a simultaneously jarring and fluid sound that is sometimes referred to as the "whiplash" effect.

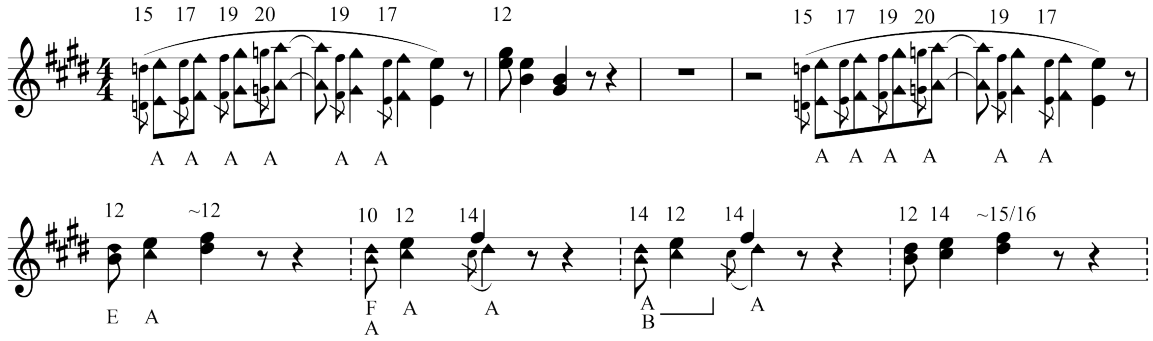

Figure 3-21. Lloyd Green, "I Can See Clearly Now" (rec. 1973), pedal steel melody [0:14-0:22], showing four possible executions of the final measure.

Green's "I Can See Clearly" also takes on the character of a demonstration of the E9's musical language, through the contrast between the "call-and-response" of the two parts of each phrase. While the first part ("I can see clearly now the") shows the uniquely pedal-oriented new octave technique, the second part ("rain is gone") somewhat abruptly shifts to a more typical diatonically harmonized setting, played with Green's more typical articulation. This example also provides a window into the difficulties of transcribing and

analyzing Green's playing, as his unconventional setup and frequent use of alternate positions and bar slants means that for many musical gestures, there are multiple, equally logical methods of execution (see Figure 3-21, mm. 7a–7d). The first potential solution would be a typical gesture for someone who lowered their upper E string to D#, allowing for the entire measure to be played at one fret. The second possibility directly substitutes the A pedal/F (E#) lever combination back two frets for the lowered E. In the third solution the initial major third is played on strings 5 and 6 with the A and B pedal down, followed by the minor thirds on 4 and 5 with the A pedal. The last solution uses no devices, and is played entirely on strings 2 and 5, beginning with the open major third and continuing with a reverse bar slant to change the interval to a minor third. That each of these methods of playing the passage would have little, if any, audible difference highlights one of the contingencies of instrumental ideation—that is possible to recreate a musical sound without recreating the exact experience of playing it.

A final example of Green's playing demonstrates the restrained lyricism that marks his work on ballads, and, like Emmons's "Danny Boy," serves as an exemplar of the total integration of Green's musical and mechanical scripts. Recorded in 1979, Gene Watson's "Farewell Party" was a major hit for the singer, and is considered some of Green's finest playing (see Ex. 3-22). His solo features passages in thirds and sixths, the simulated oblique motion created by moving the bar simultaneously with the deactivation of a pedal (m. 2), and a simple gesture with the A and B pedals that shows the continued importance of the aesthetic introduced twenty-five years earlier in "Slowly," while simultaneously demonstrating Green's perpetuation of the bar techniques of the pre-pedal steel guitar.

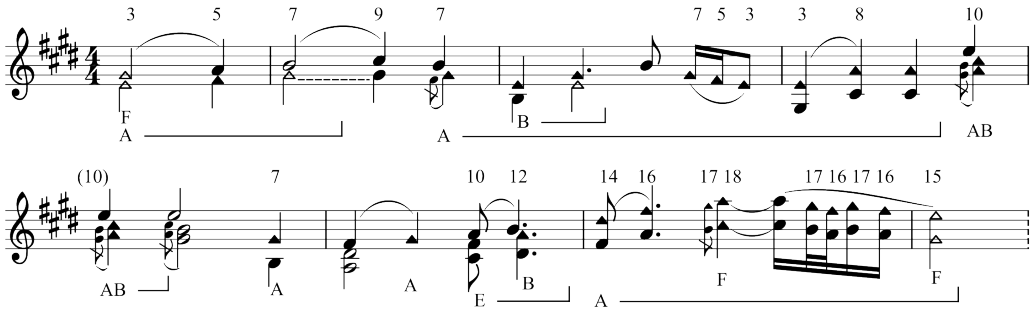

Figure 3-22. Gene Watson, "Farewell Party" (1979), pedal steel solo by Lloyd Green [1:47-2:08].

Whereas Buddy Emmons's musical and mechanical experiments with the pedal steel lead to tension between him and the practices of the Nashville studios, Lloyd Green's enthusiastic engagement with the hit-making process proved highly compatible with his approach to the instrument's technology. Rather than emphasizing the pursuit of new ideas based on its mechanics, he treated the pedals and knee levers as expansions to his existing techniques, and retained more of the non-pedal style than many players. Green's decision to abandon the C6 neck also speaks to this philosophy, in which the elimination of some common features (in this case the entire tuning and its associated sounds and gestures) propelled the refinement of both his techniques and the streamlined mechanical vocabulary of the E9 neck. As I will discuss in Chapter Four, Green's musical decisions aligned with a host of cultural factors to solidify the E9 tuning as the primary form of the pedal steel from the 1970s onward.

Ralph Mooney: "...But I Do Play Nasty*"*

One of the most noted pedal steel players to come from outside of the Nashville scene in the 1950s, Ralph Mooney developed a unique configuration and style that

exerted an indelible influence on the distinct sound of Californian country music, particularly the style known as the "Bakersfield Sound." Born in 1928 in Duncan, Oklahoma, Mooney's initial experiences with the steel guitar followed the trajectory of many of his contemporaries.[49] His first exposure to the instrument came through the recordings of Bob Wills and his Texas Playboys, which featured steel guitarist Leon McAullife, and he later became a devotee of Noel Boggs. By 1942, Mooney and his family moved to the suburbs of Los Angeles, where he began playing with Western swing groups such as Merle Lindsey's Oklahoma Nightriders. In this scene, his style shifted from what he recalls as "really corny steel guitar—derived from both the Hawaiian sound and mainstream country—to the more improvisatory approach favored by the fiddle players and guitarists of the Southwestern school of swing. This shift entailed his embrace of the philosophy of "playing around the melody," an attitude grounded in the relative freedom of live performance, as well as a conscious departure from the Nashville aesthetic. Unlike players such as Emmons, whose experience was tied to his continual experimentation with both his instrument and musical styles, and Green, whose approach to the pedal steel was grounded in a very deliberate intellectual process, Mooney's style can best be described as intuitive or organic—projecting a sense of "play" through a virtuosic lightness in not only his right- and left-hand techniques, but also his particular use of the pedals. Mooney was always modest about his technique, claiming in a 1980's Sho~Bud advertisement that he didn't even know what all of his

[49] In contrast to some of the other well-known players, Mooney gave relatively few interviews. One of the most extensive is the basis of Carter and Sallis. "The Ralph Mooney Story."

pedals did, and his aesthetic was the opposite of refinement: "I don't play a lot of your fancy stuff, but I do play *nasty*."[50]

The co-constructive dialogue between Mooney and his instruments, which fueled the evolution of his musical style, can be seen in three distinct periods of his early recording career, each marked by a change in either his instrument or its configuration. According to Mooney, he began his career on a homemade double-neck lap steel, although in photographs from the 1940s and early 1950s, he can be seen with several commercially available instruments.[51] On his earliest known recordings, ca. 1954–55, Mooney displays a technique that retains a heavy influence of the polyphonic Hawaiian-inspired style, but inflected with a predilection for bottleneck blues–like bends and figures. Around the end of 1955, Mooney added a homemade pedal to his console steel, configured to the Isaacs change.[52] Then a staff musician for Capitol Records in Hollywood, Mooney began long-term recording relationships with several artists, most notably Wynn Stewart, with whom he recorded until the 1970s.[53] With the addition of the pedal, he expanded on the new aesthetic emerging from Nashville to develop his own signature style, which featured a bouncy right-hand articulation and a distinctive rolling arpeggio figure that highlighted the action of the pedals. Sometime between 1959 and 1961, Mooney acquired a Fender 1000 (a model with two eight-string necks and eight pedals) that he set up with a unique configuration in which each pedal activated only one

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[50] Quoted in Sho~Bud Guitar Company, advertising pamphlet, ca. 1980.

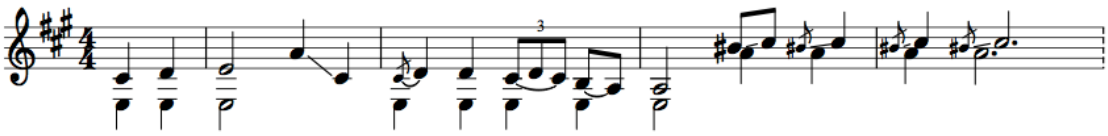
[51] Both his story and several photographs are found in Carter and Sallis, "The Ralph Mooney Story," 25–26.

[52] This guitar can be seen in a undated photograph of Mooney and Stewart from the 1960s. Gray and Rumble, *The Bakersfield Sound*, 43.

[53] Wynn Stewart, *Wishful Thinking*, Bear Family Records BCD 15886 JI, 2000, 10 CDs.

string. Like Lloyd Green, Mooney focused his pedal innovations on the E9 neck, leaving his second neck in an open G tuning that he only rarely used. On the Fender, Mooney contributed to the formative recordings of the Bakersfield Sound, playing on the early recordings of Buck Owens and Merle Haggard.[54] In 1970, he began recording and touring with Waylon Jennings, a relationship that would continue through the late 1980s. Around the same time, he was given a double-neck Sho~Bud, but maintained the core of his tuning and setup (notably lacking the top two re-entrant strings), as well as pickups designed to emulate the sound of Fender's, throughout the remainder of his career.

Among Mooney's earliest documented recording sessions is a 20 August 1954 date with singer Terry Fell.[55] On the four songs recorded that day, Mooney shows himself to follow in the footsteps of West Coast players such as Noel Boggs, Herb Remington, and Speedy West, displaying a polyglot style that combines elements of the Hawaiian tradition (passages in parallel sixths, tremolo picking, and portamento) and Western swing (edgy tone, angular rhythms, and pull-offs and hammer-ons). Many of these elements are heard in the introduction to the track "Let's Stay Together Till After Christmas" (Ex. 3-23).



Ex. 3-23. Terry Fell, "Let's Stay Together Till After Christmas" (rec. 1954), steel guitar intro by Ralph Mooney [0:00-0:08].

[54] The use of Fender steel guitars in this scene paralleled the use of the Fender Telecaster by guitarists Roy Nicholls, James Burton, and Don Rich. Buck Owens, *Act Naturally: The Buck Owens Recordings 1953–1964*, Bear Family Records BCD 16850 EK, 2000, 5 CDs; Merle Haggard, *Untamed Hawk: The Early Recordings of Merle Haggard*, Bear Family Records BCD 15744 EI, 1995, 5 CDs.

[55] Terry Fell, *Truck Driving Man*, Bear Family Records BCD 15762, 1993.

This example showcases one of Mooney's most distinctive techniques, a marked emphasis on counterpoint between open and stopped strings, which he carried forward throughout the evolution of his style. Employing a Hawaiian-style A major tuning, Mooney accompanies the entire introduction with bass notes, beginning with low E and A strings, and concluding with the upper A string. Against these pulsed open notes, he plays off of the open C# string, hammering on to the D of the E7 chord in the second full measure, and following with a fast trill consisting of a hammer-on and immediate pull-off (a hallmark of McAuliffe's style). He ends with a series of slides into a C# in the higher register, which is reminiscent of many of Don Helms's introductions for Hank Williams, but rendered distinctive by its juxtaposition with the ringing of the open A string just a third below. Through all of this, Mooney plays with a sharp right-hand articulation that produces the "twangy" tone that distinguishes his playing as country rather than Hawaiian or swing.

By early 1955, Mooney began working as a staff musician at Capitol Records in Hollywood, recording with artists such as singer Skeets McDonald, with whom he recorded nineteen tracks between 1955 and 1958.[56] McDonald, a transplant from Arkansas by way of Detroit, fostered a style that blurred the lines demarking Western swing and Nashville country, similar to the early honky-tonk of Ernest Tubb and Ray Price.[57] In his first session with McDonald, recorded 11 January 1955, Mooney provided

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[56] Skeets McDonald, *Don't Let the Stars Get in Your Eyes*, Bear Family Records BCD 15937, 1998.

[57] Charles K. Wolfe, *Classic Country: Legends of Country Music* (New York: Routledge, 2001), 268.

steel for three songs, including "You're Too Late," an up-tempo song with twin fiddles and a two-beat feel. The introduction to this track offers a rich display of Mooney's evolving style, replete with the droning open strings, hammer-ons, and pull-offs of the previous examples, and adding a key syncopated figure that was a major component of his early pedal work (see Figure 3-24).

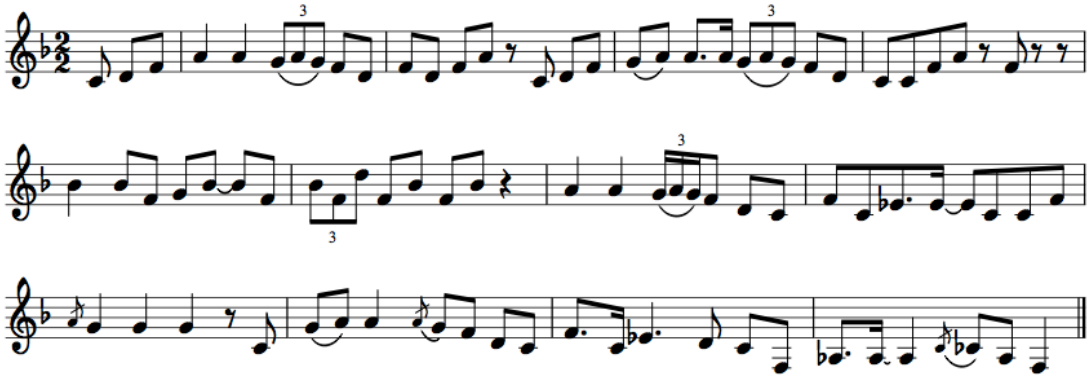

Figure 3-24. Skeets McDonald, "You're Too Late" (rec. 1955), steel guitar solo by Ralph Mooney [1:55–2:14].

Seen in mm. 5–6 of this example, Mooney plays a "rolling" rhythm that indexes the bluegrass banjo, the ragtime piano, and the African American rhythm traditions in which their origins lie. While only a small part of this solo, this rhythmic feel is heard prominently in the piano accompaniment to the chorus of "I Can't Stand It Any Longer," in that same session (see Figure 3-25).

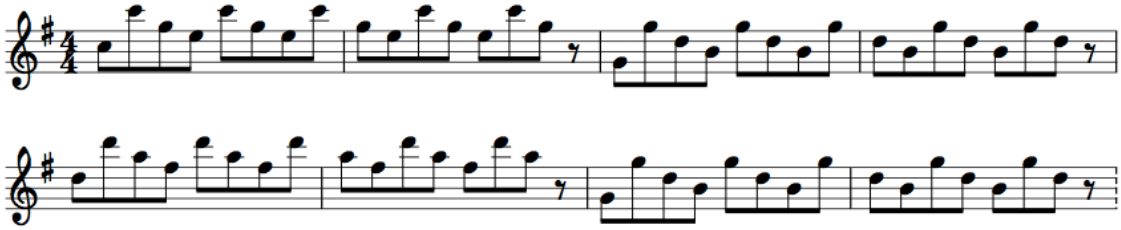

Figure 3-25. Skeets McDonald, "I Can't Stand It Any Longer" (rec. 1955), piano accompaniment by Billy Floyd [0:25–0:33].

Mooney recorded one other session that year with McDonald, but aside from that, the regrettable lack of credit given to session players in this period leaves the remainder of his work in 1955 a mystery. A little over a year after his first sessions at Capitol, Mooney began another long-term recording relationship, this time with singer Wynn Stewart. In their first session together, on 30 January 1956, a major change is immediately discernible, as Mooney kicks off the introduction of "It's Not the Moon That Makes the Difference" with a series of rapid-fire pedal gestures that move the Isaacs change from the fifteenth fret down to the tenth and the fifth over six quick beats; the passage culminates in a cadence on the D chord at the tenth fret, ornamented by a figure that combines the action of the pedal with the syncopated roll featured in his playing with McDonald (see Figure 3-26).

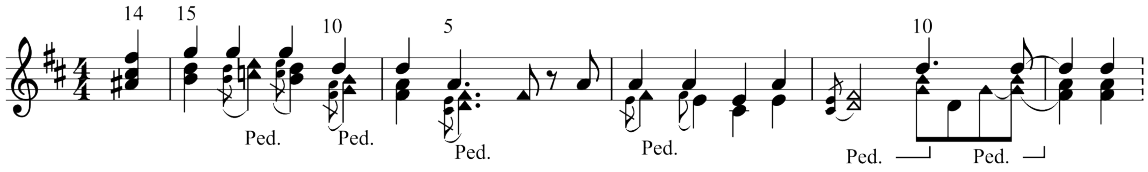

Figure 3-26. Wynn Stewart, "It's Not the Moon That Makes the Difference," pedal steel introduction by Ralph Mooney [0:00–0:08].

This brief introduction shows not only Mooney's adoption of the Isaacs style, with its upper pedal points and harmonic ornamentation of key chords—the C major chord in m. 1, for example, would not normal be found in the key of D major—but also his adaptation of the pedal to produce a similar effect to his prior juxtapositions of open strings and bar gestures (m. 3). The rolling gesture leading into the cadence on m. 5, however, is the quintessential feature of Mooney's emergent pedal style. He begins by striking strings 1, 2, and 3 with the pedal down and the bar at the tenth fret—a G major

chord—then drops his thumb to strike the D on string 5, followed by the G on 3, and finally the B and D on the highest strings on the penultimate eighth note of the measure. He then releases the pedal on the downbeat, resolving to the tonic D major chord, but not articulating the chord until the second beat of the measure.

This ornamentation of the cadence is heard in the majority of Mooney's tracks over the subsequent few years, in varying moods and at varying speeds, as in the end of singer Joe Carson's waltz-tempo ballad "Passion and Pride," recorded in December 1956 (see Figure 3-27). Played in a quasi-rubato at the close of the track, the gesture is transformed into an almost sacred plagal sigh, emphasizing the ways in which players adapt the physical building blocks of instrumental techniques to suit the needs of multiple contexts.

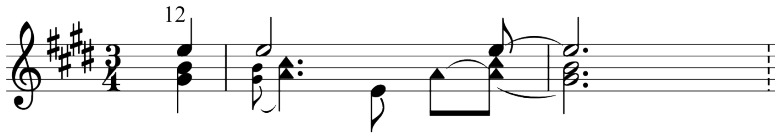

Figure 3-27. Joe Carson, "Passion and Pride," (rec. 1956), pedal steel cadence by Ralph Mooney [2:54–3:00].

Beyond its use as a cadential figure, this pedal gesture became central to Mooney's solos as well, where he used its syncopated feel as a driving force by repeating as a riff. This can be heard in his solo on Stewart's "Slowly But Surely," a track with an otherwise markedly rock 'n' roll–influenced arrangement that presages the later "rock 'n' twang" of Buck Owens and other Bakersfield stars (see Figure 3-28).

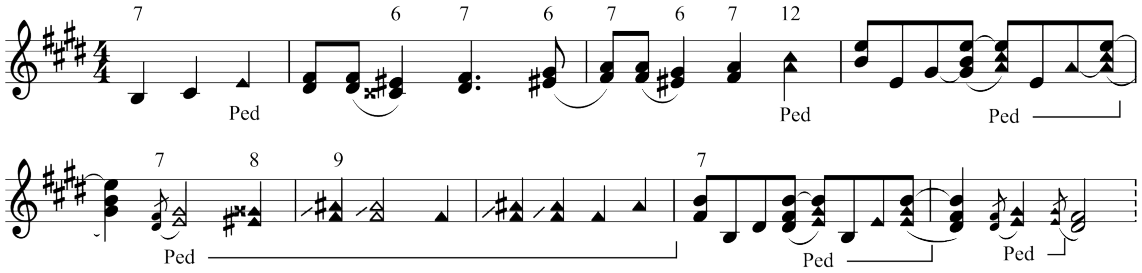

Figure 3-28. Wynn Stewart, "Slowly But Surely" (rec. 1956), pedal steel solo by Ralph Mooney [1:18–1:30].

Over the next several years, Mooney provided similar playing for tracks by Stewart and McDonald until, following the trend of many of their Nashville contemporaries, both singers recorded without steel guitar in the late 1950s, with Stewart in particular aiming for a Buddy Holly–esque rockabilly sound. By that time, however, singer Buck Owens had emerged from the Los Angeles scene, releasing a series of singles with styles ranging from the rockabilly of "Sweet Thing" to the twin fiddles and steel guitar of "I'll Take a Chance on Loving You" and his first single to reach the Country charts, 1959's "Second Fiddle." Owens's last single of the decade, "Under Your Spell Again," was his biggest success to date—reaching number 4 on the country chart—and presented a sound aesthetic that would dominate his and other Bakersfield artists' recordings for the subsequent decade. This aesthetic included an up-tempo shuffle feel with a walking bass line and a strong backbeat on the snare drum, two-part vocal harmonies on the chorus, and the foregrounded, aggressive steel guitar provided by Mooney.

Recorded on 16 June 1959, "Under Your Spell Again" showcases Mooney's increasingly unique style, centered on his nimble use of the pedals to create ornamental melodic gestures that echo the hammer-ons and pull-offs of his earlier recordings.

Mooney is featured throughout the track, playing continuously under the vocals and in transitions, only stopping for the short verses, which are accompanied by the fiddle. His techniques are readily apparent in his solo, which expands on ideas heard during the short introduction (see Figure 3-29).

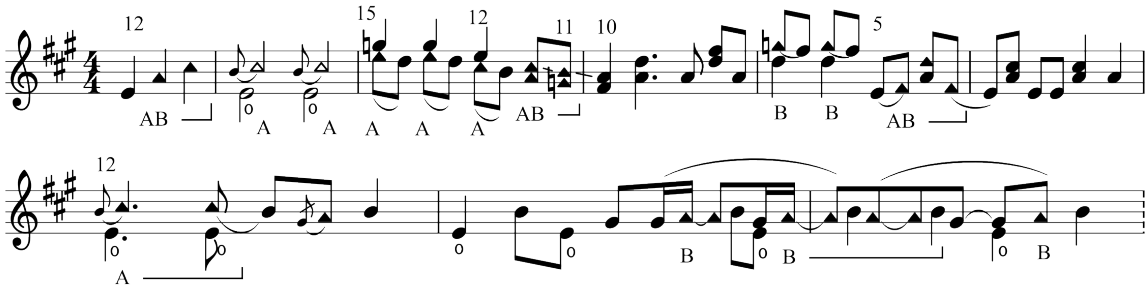

Figure 3-29. Buck Owens, "Under Your Spell Again" (rec. 1959), pedal steel solo by Ralph Mooney [1:22–1:35].

Aside from the rapid pedal work of the second and fourth full measures, Mooney's older style is recalled through his use of the open E string throughout the example. As this is the second string—further away from his body—this string is played with the index or middle finger of the right hand, while the higher melody is played with the thumb, creating a unique pattern of accents. This is particularly apparent in the final measures of the example, in which the open E string is juxtaposed with the B and G# strings played one octave higher with the bar at the twelfth fret, and Mooney works the G#–A pedal (now split from the B–C# shared by the Isaacs pedal) with only limited right-hand articulation. This recording also presents one of the earliest recordings in Mooney can be heard playing the high G# string, raised to A with a pedal—an addition to the E9 tuning that is commonly credited to him, and soon became part of the standard tuning. Mooney uses this change in conjunction with another of his important devices, the pedal raising the E string one whole step to F#. Together, these pedals perform a similar function to the

Isaacs pedal, but raising the major third of the E and G# strings to a minor third. This harmonization is often used to suggest the same subdominant chord above the open strings, but with an added sixth.

The evolution of Mooney's style at this time was deeply affected by his acquisition of his Fender 1000 pedal steel. The bright sound of the Fender pickups were an ideal match for his sharp articulation, and the simple undercarriage mechanics enabled him to easily transfer the setup of his homemade guitar. The eight built-in pedals allowed him to easily expand his options, as well, and he capitalized on their alignment across the front of the instrument to have his most used changes conveniently arrayed for his use of both feet (See Fig. 2-9). In a major departure from the Nashville E9 setup, Mooney maintained a ratio of one pedal to one pitch change, including not only the split of the Isaacs pedal into two, but also keeping the upper G#–A change separate from the lower octave. This arrangement facilitated a quicker pedal action (as each pedal was required to exert less force), and also enabled one of Mooney's most distinctive changes, the lowering of the G# to G-natural. When combined with the raise of the lower G# to A, this provided a dominant seventh chord with the pedals down while allowing for the "bleeding" action of the B–C# on the other pedal. At least partly due to this arrangement, he established his E9 tuning on the back neck of his instrument, enabling him to easily glance down to monitor what his feet were doing.

With the expanded melodic possibilities afford by his evolving pedal setup, Mooney's earlier chordal rolling style was transformed into a rolling melodic sensibility. This increasingly single-line style is displayed in Wynn Stewart's 1961 single, "Big, Big

Love," which also shows Mooney using his lowest open string, tuned here to A3 (see 3-30).

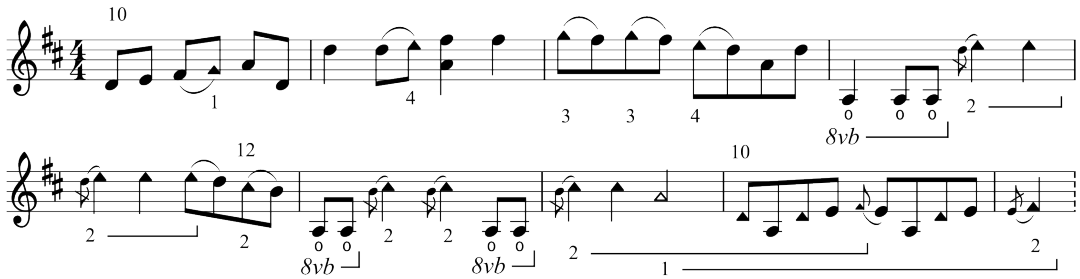

Figure 3-30. Wynn Stewart, "Big, Big Love" (rec. 1961), pedal steel solo by Ralph Mooney [0:59–1:19].

Of particular note in this example are the ascending melodic run of the pickup and the cascading pattern in the second full measure, both of which were later adopted into the standard E9 vocabulary (see, for example, Example 2-12). A fairly direct translation of the earlier syncopated chordal rolls can be seen in the final measure of the example, adapted into a single-line figure.

The final addition to Mooney's setup, the lowering of the first string G# to G-natural, came as the result of breaking his normal string, and only being able to tune the replacement that he found to G. Because he already split the raises of the two G# strings, he was able to incorporate this change as part of a pedals-down dominant seventh chord. This change can be prominently heard in his introduction to Merle Haggard's number three country single from 1966, "The Bottle Let Me Down" (see Figure 3-31).

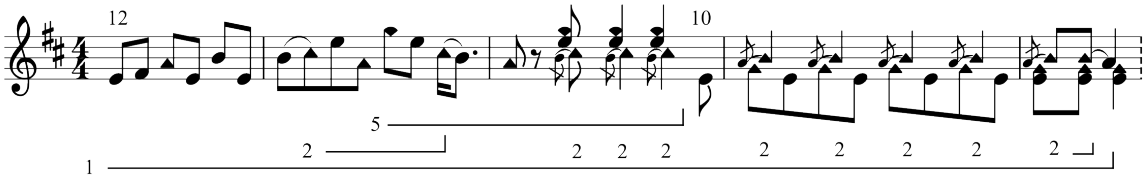

Figure 3-31. Merle Haggard, "Tonight the Bottle Let Me Down" (rec. 1966), pedal steel intro by Ralph Mooney [0:00–0:08].

The close voicing of the upper three notes of the A7 chord in m. 2, combined with the slur into the diminished fifth of the C# and G, exemplifies the aesthetic that Mooney referred to as his "nasty" sound. This is carried forward into the next measure, where his rhythmic playing a different voicing of the dominant seventh chord emphasizes both the whole step between the seventh and the upper root and the dissonance of the ninth.

The enduring individuality of Mooney's sound and style can be seen in the adjustments made by players of typically configured instruments in the pursuit of his figures and chord voicings. One example is the bodily contortions needed by Buddy Emmons in his solo on "Drivin' Nails in My Coffin" (Example 2-13) to achieve a Mooney-esque figure involving the E–F# raise. Another example is the case of Norman Hamlet, who succeeded Mooney in the steel guitar seat of Haggard's band, the Strangers. While it is possible to play the seventh chord heard in "The Bottle Let Me Down" by raising the first string of the Nashville tuning from F# to G, it loses something of the character of its execution on three adjacent strings. Seeing this exact voicing as a crucial part of recreating Mooney's sound, Hamlet had a dedicated knee lever (later moved to a pedal) that provided the contrary motion afforded by Mooney's second and fifth pedals, simultaneously raising the lower G# and lowering the upper octave.[58] Given the instrument's capacity for multiple solutions to musical "problems," the need for special techniques and configurations to recreate an individual's style is a testament to the unique relationship between each player and their instrument.

[58] This can be seen in the diagram of Hamlet's setup in Winnie Winston and Bill Keith, *Pedal Steel Guitar* (Oak Publications 1975), 123.

Conclusions

As these case studies demonstrate, the innovative professional pedal steel players of the 1950s and 1960s each pursued their own personal scripts for the use of the burgeoning instrument technology, selectively drawing upon the mechanical and musical circulating in their communities. Though strongly influenced by the settings in which they worked, their evolving individual ideas about music and about the mechanics of the instrument shaped their sound and the sound of the artists with whom they played. By the mid-1970s, however, many players had settled into a stable setup that retained different aspects of their trials, errors, and other experimentation. These disparate progressions are displayed in the histories of Emmons, Green, and Mooney, whose divergent career paths, philosophies, and musical ideas display highly individual conceptions not only of the pedal steel, but also of music itself. Emmons presented a multifaceted vision for the instrument that placed the dual traditions of the C6 and E9 tuning in a dialogue that drew on ideas from across the spectrum of musical genres. While he maintained many of the vestiges of traditional techniques on the C6, his E9 playing displayed a holistic fusion of mechanical and musical ideas that pervaded every aspect of this style. Green, on the other hand, followed his intellectual predilections to develop a streamlined pedal steel that combined the core techniques of non-pedal playing with the most characteristic aspects of the E9 pedal tradition. His deliberate focus on technique over technology rendered his style harder to analyze and imitate than one grounded in mechanical gestures. Slightly more isolated from other players due to geography, Mooney's explorations show a gradual progression through a series of instruments that each afforded different ways for him to realize the musical aesthetics that he had largely established in his early career.

The close link between the technology of the pedal steel and the ideation of its players is demonstrated by the slight differences in Mooney's configuration that render it difficult to duplicate his playing with other setups.

As each of these players followed their own personal scripts to different ends, how did the instrument come to have the "typical" form that facilitates the shared musical scripts evidenced by the theoretical and pedagogical ideas that surround the modern instrument? The answer to this question lies in a series of transformations of the pedal steel's mechanical and cultural scripts in the 1970s, the end result of which was not only a culmination of the previous decades of development, but also a shift in the status and significance of the instrument that continue to define it in the twenty-first century.

CHAPTER FOUR: CLOSING THE STEEL?

By the mid-1970s, the pedal steel guitar was clearly recognizable in its modern form, after nearly three-quarters of a century of development. Its evolution began, as shown in Chapter One, with an alteration to the mechanical, musical, and cultural scripts of the conventional Spanish guitar that originated in Hawaii, and found resonance with other instrumental and vocal traditions in the United States. As discussed in Chapter Two, new mechanisms were established for the pedal steel guitar over the course of the 1950s and 1960s, resulting in an instrument consisting of a set number of strings that can each be raised or lowered a predetermined amount by any one of a series of foot pedals or knee levers. In theory, this lends a vast number of possibilities for tunings, interval combinations, and musical gestures. The individual approaches to the pedal steel detailed in Chapter Three demonstrate the relative independence of the setups used by professional players, which was the natural result of the fluid notions about what the instrument could and should do that drove its development for over three decades. With this marked openness of the instrument's use as a technology, why are the majority of pedal steels still tuned to the same E9th and C6th tunings fifty years later in the twenty-first century, with the same core of pitch changes used in the 1960s?

The answer lies in the process of *closure*—the way in which a technology is rendered stable, not only in terms of form and function, but also as an object embedded within a particular cultural context. This is not a technological process, but rather a social

one involving the explicit or implicit agreement of the majority of a technology's users. Taken to its literal extreme, closure can imply the end of user input and the onset of a determinist relationship in which technology dictates the actions of its users. This construction is especially problematic in the case of musical instruments and other tools for making art, as their use is rooted in individual expression. A more nuanced approach sees closure as a stabilized script that is taken for granted by users rather than deterministic of their actions. Users thus make assumptions about context and accept (but are not limited by) conventions of use and the automation of tasks or movements. Musical instruments offer varying degrees of automation in the form of the means of sound projection (resonant bodies, bells), intonation (keys, open strings, frets, valves), and the basic organization of pitches that constitute the hierarchies that define tonality, modes, and harmony. Rather than viewing these elements as essentially oppositional forces to the freedom of expression and individual agency, I propose that technological closure can be read as an expression of consensus, reflecting the co-construction not only of the object in question, but also of communities of users. Closure can thus be seen fostering a kind of *inertia*, in both senses of the word: an object at rest tends to stay at rest, and an object in motion tends to stay in motion. On the one hand, the continued evolution of the technology meets the resistance generated by the proverbial mass of common practices shared by increasing numbers of users. On the other hand, the forward momentum of the experimentation embraced by some users fosters a self-perpetuating state of development. Particularly in the case of musical instruments, the tension between these two states fosters a continual friction between the old and new, the familiar and unfamiliar, and the conventional and transgressive.[1]

[1] My idea of "inertia" parallels Misa's use of the term "momentum" to describe "social processes

In the case of the pedal steel, closure can be seen in the varying degrees of stability reached by its musical, mechanical, and cultural scripts. To say that the pedal steel guitar reached a point of effective closure in the mid-1970s does not mean that its form became rigidly fixed, or that players lost their ability to experiment with new features; in fact, the pitch-changing mechanisms have continued to be perfected, to the point that on professional quality instruments, any string can be raised or lowered as much as three half-steps by any of the pedals or levers. However, the marked openness of this system has rarely been the focus of the pedal steel tradition beyond the developments of the 1970s.

In this chapter, I discuss the factors that contributed to the closure of the pedal steel guitar. First and foremost, the stabilization of the instrument can be seen in the establishment of a (mostly) concrete definition of its basic design parameters, as well as the common acceptance of its name. Further, the increasing demand for instruments led to an ever-higher degree of standardization in the manufacture of pedal steels. This trend went hand-in-hand with the continued acceptance of the 10-string E9 tuning as the dominant incarnation of the pedal steel, along with a series of commonly used pedal and knee lever setup. A growing amateur market also influenced the manufacture of less expensive, entry-level instruments that established a base line for what a pedal steel sounded like, and how it could operate. Along with the standardization of its technology, the musical scripts of the pedal steel reached effective closure through a shift in their dissemination from oral transmission to the written word. Beginning in the late 1960s, the

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by which large technological systems shape their own growth and appear to become autonomous." I prefer the term "inertia" for affordance of both rest and continued motion, and its implication of resistance between these opposing forces. Thomas J. Misa, "Controversy and Closure in Technological Change: Constructing 'Steel'," in Bijker and Law, eds. *Shaping Technology/Building Society*, 110.

publication of the first pedal steel instruction manuals contributed to the construction of a more homogenized body of techniques as well as a dominant narrative of the instrument's history and traditions. Alongside this transformation into a notation-driven music, the tradition of the instrument shifted its emphasis from exploration and innovation to a focus on the mimesis of past explorers and innovators. This pattern was reinforced by the emergence of a canon of recordings, through which amateurs could study the techniques and styles of players both past and present. This canon, as well as the narratives of history and technique, was legitimized by a new network of communities that mitigated the typically individual experience of learning pedal steel with a socially constructed body of knowledge.

What's In a Name?: The Ontology of the Pedal Steel

In any historical narrative, the drive for clarity leads inevitably to definitions and periodization. In the story of the pedal steel, it is easy to credit the release of "Slowly" as the point of origin for the modern pedal steel. As discussed in Chapter Two, this is accurate in the sense that it represented an important shift in Bud Isaacs's playing style, but it also occludes both the limitations of Isaacs's instrument and the important contributions of other players over the subsequent two decades.

People did not wake up in January 1954, flush with the knowledge that the pedal steel guitar had arrived. *Billboard Magazine*, for example, makes no mention of the instrumental arrangement, stating only that "The high range of Pierce's voice is in great shape as he wraps up these sides. This can be a real big record."[2] Nor is the steel

[2] "New Records to Watch," *The Billboard*, 16 January 1954, 28.

mentioned as a factor in its continued success in July of that year.[3] Reviews of Isaacs's instrumental singles such as "Hot Mocking Bird" and "Bud's Bounce," the latter of which heavily features the pedals in its melody, mention only features such as their virtuosity ("rapid tempo") or their superficially "Hawaiian-flavored" sound."[4] With the exception of the relatively small community of steel guitar playing listeners, Isaacs's playing was heard as an especially catchy steel guitar part (if they even knew that it was a steel guitar), or perhaps a Hawaiian guitar, a Hawaiian steel guitar, a lap steel guitar, a slide guitar, or one of the other myriad terms used to describe the family of instruments.

Throughout the patent literature of the 1940s and 1950s, the various pedal inventions are generally considered accessories to the steel guitar rather than elements intrinsic to its identity. As discussed in Chapter Two, the earliest commercially produced "pedal steels" were called the Electraharp, the Multi-Kord, the Multiharp, or other terms divorced from the guitar-oriented nomenclature. The earliest patent to incorporate the pedals into its instrument's name is a design patent filed in August 1958 by Fender, which refers to it as a "pedal guitar."[5] Interestingly, the full patent for the first Fender pedal steel (filed in July 1957) does not refer to the pedals, calling the design a "lute-type instrument, such as an electric steel guitar."[6] A patent that closely follows the Fender design, filed by inventors Robert Irvin Smith and Billy Jess Woodruff in 1961, calls it an

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[3] "Then, of course, Slowly, which is No. 4, has been on the charts for a full half-year—a feat rarely, if ever, accomplished by pop artists." "Talent Corner," *Billboard*, 31 July 1954, 26.

[4] "Reviews of New Pop Records," *Billboard*, 10 April 1954, 40; "Reviews of New C & W Records," *The Billboard*, 27 November 1954, 45; "Reviews of New C & W Records," 26 March 1955, 134.

[5] Clarence L. Fender, *Pedal Guitar*, U.S. Patent Des. 186,190, 20 August 1958 (22 September 1959).

[6] Clarence L. Fender, *String Tension Controlling Means for Lute-Type Instrument*, U.S. Patent 2,973,682, 22 July 1957 (7 March 1961).

"electric steel pedal guitar," a term that is echoed in Fender's second design in 1963.[7] Even the first Emmons and Sho~Bud patents, filed in 1965 and 1966, respectively, simply refer to their subjects as "electric steel guitars" or simply guitars.[8] The first patent to use the term "pedal steel guitar" was filed in 1966, and the newness of the term is suggested by the definition proffered by the inventor, which does at least confirm the increasingly stable aspects of the instrument's form: "this invention relates to so-called pedal steel guitars having one or more necks and provided with pedals or the like by means of which the player may raise or lower the pitch of one or more strings to obtain tones above or below those to which the strings are normally basically tuned."[9]

Outside of patents, the name "pedal steel guitar" begins to appear in print sources in the late 1960s, including the first published instructional materials and the writings of Paul Graupp (see below), but the practice of referring to the instrument more generically as "steel guitar" persisted into the 1970s and beyond. The fluidity of terminology throughout the 1950s and 1960s is significant in reflecting the nascent pedal steel's openness as a technological object. During this time, the term can be seen as primarily embodying a relatively abstract idea of a means to combine the sound of the bar with changing pitches. By the beginning of the 1970s "pedal steel guitar" represented something much more specific to practitioners, and came to engage a series of expectations among the general audience.

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[7] Robert Irvin Smith and Billy Jess Woodruff, inventors, *Tone Changer for Electric Steel Pedal Guitars*; Clarence L. Fender, *String Mounting for Steel Pedal Guitars*, U.S. patent 3,352,188, 17 July 1963 (14 November 1967).

[8] Lashley and Emmons, *Guitar Tone Changing Device*; Jackson, *Tuner for Electric Steel Guitar*.

[9] Arthur W. Alifano, *Pitch Changing Means for Pedal Steel Guitars*, U.S. Patent 3,442,716, 18 February 1966 (21 January 1969).

Standardization and Refinement

The Professional, the Universal, and the Amateur

As the "pedal steel"–ness of the pedal steel became established, the musical features that were developed in the late 1950s and early 1960s lead to a relatively standardized set of tunings. As seen in a 1967 advertisement for Sho~Bud strings, those tunings were the "E 9th Chromatic," the "C 6th," and the "D 9th chromatic," which was identical to the E9 but tuned down a whole step (see Figure 4-1).[10]

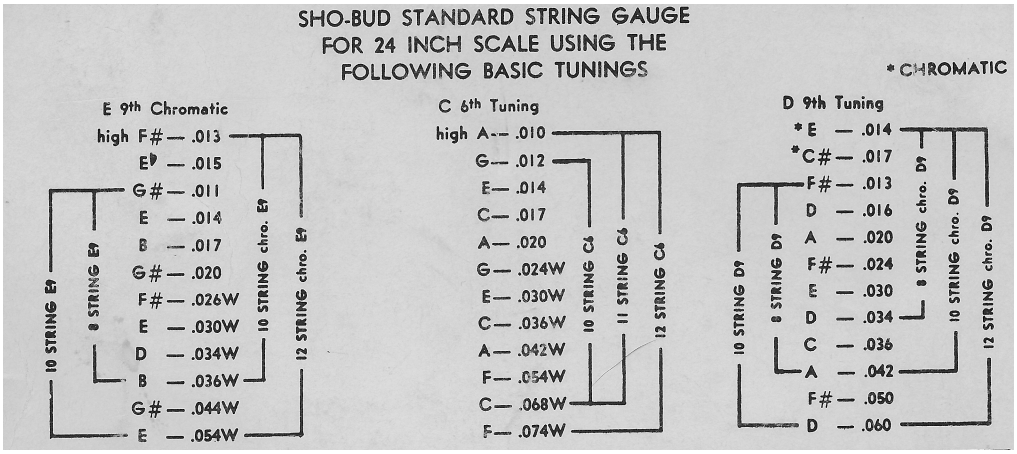

Figure 4-1. Detail from Sho~Bud Guitar Company, Advertisement, 1969.

The so-called chromatic tuning incorporated the two reentrant strings that Buddy Emmons popularized in the mid-1960s while playing with Ray Price. As the chart in Fig. 4-1 shows, each of the two "chromatic" tunings was available in eight-, ten-, and twelve-string iterations, and the C6 was available in ten-, eleven-, and twelve-string sets (a double-neck twelve-string "Fingertip" model is pictured on the front cover of the book). The eight-string E9 and D9 tunings remained close to those used by players of non-pedal steels, as well as players like Bud Isaacs and Ralph Mooney, who continued to use their

[10] One reason for the lower tuning was to minimize the frequency of broken strings, especially on the high G# string.

early 50s tunings into the next decade. The options for the ten-string models show that while the chromatic tuning had become relatively standard, there were still players who preferred the older tuning, with its extended low register.

Accompanying this chart is a text that nicely represents the standardized technological ideals that Sho~Bud sought for their pedal steels to embody:

> These charts are the results of extensive tests by SHO-BUD engineers and insure the professional musician the most efficient string gauge for the note desired. These suggested gauges will allow the musician to lower or raise the string a maximum of two frets [i.e. one whole step]. Knowing your basic tuning and pedal arrangement, we can build you a set of strings for your own individual style.[11]

The emphasis on professional musicianship would be reflected in the names given the Sho-Bud models of the early 70s: the Professional, the Pro-II, and the Super-Pro.

Compare this with an Emmons Guitar Co. brochure from ca. 1967, which promises instruments that are "SCIENTIFICALLY DESIGNED for those who prefer the ultimate," and features a personal statement from Buddy Emmons describing how his guitars "[employ] all the outstanding features found on various pedal guitars such as the roller bridge and nut, universal pedal system actuated by rods, smooth adjustable pedal travel, and last but not least a powerful tone sustaining pickup" (see Fig. 4-2).[12]

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[11] Sho~Bud Guitar Company, Advertisement, on back cover of DeWitt Scott, *The New Sho~Bud Pedal Steel Guitar Course* (Nashville, TN: Sho~Bud Guitar Co., Inc., 1969).

[12] Emmons Guitar Company, Inc., Brochure, ca. 1967. Personal collection of the author.

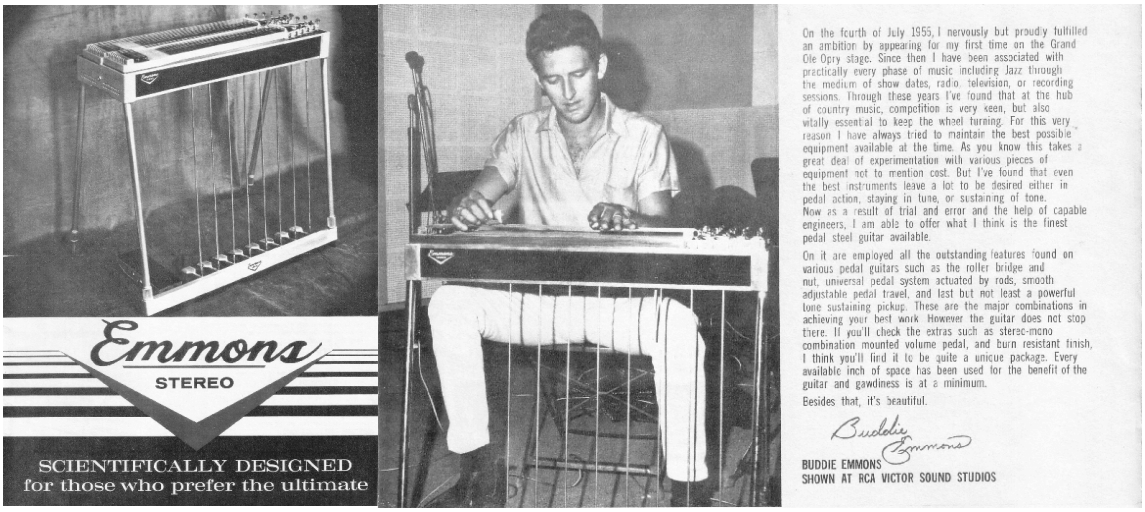

Figure 4-2. Emmons Guitar Company, Brochure, ca. 1967.

Both advertisements assure the potential buyer that these are serious instruments for serious players, "scientifically designed" by "engineers," and capable of fulfilling any of their playing needs. This second claim is indicative of the "universal" ideal, which follows the mindset of technological utopianism that is seen throughout the history of the electric steel guitar and its various incarnations. Especially during the late 1960s, which can be seen as the height of the pedal steel's "openness," the universal ideal went along with the quest for highly personal setups capable of producing the distinctive individual sounds that were the usual path to professional success.

By the mid-1970s, however, the instruments made by these companies and others were no longer advertised as blank slates ready for each player's individual manipulation. The Sho~Bud Super-Pro, for example, came factory equipped with the standard E9 and C6 tunings and an eight-pedal, six-knee-lever setup.[13] Although Emmons still advertised its "universal" system, the universal idea had been co-opted by another alternative: the

[13] Sho~Bud Guitar Company, Brochure, ca. 1976. Personal collection of the author.

twelve-string single-neck "universal" tuning, intended to combine the major features of both E9 and C6 tunings. While this tuning was advocated by a number of key players, it remained a distant third in popularity.

At the same time that the configuration of a professional pedal steel was becoming increasingly standardized, the prices were going up (a double-neck Sho~Bud Super-Pro had a list price of $3200 ca. 1981), and the growing amateur market created a demand for lower cost, simpler instruments.[14] This demand was answered beginning in the early 1970s by instruments such as the Sho~Bud "Maverick," a single-neck instrument with three pedals and one knee lever, factory-set for the E9 tuning. While the professional standard of four or more levers was already established, the reduction to one allowed for a price point that made the instrument far more accessible to beginners ($799 in that same catalog). Originally made of a mixture of new, cheaper parts and existing components from older models, by the 1980s, the Maverick was mass-produced with cheaper, specially cast metal parts and a hardwood body covered in vinyl rather than the bird's-eye maple of the early models. Similarly simplified student models were produced by other manufacturers, including MSA's "Red Baron," and two grades of Emmons—the GS-10, similar in quality to the original Maverick ($398 in 1976), and the $750 "Black Rock," whose features and price placed it squarely between the GS-10 and the professional quality single-neck ($895). The Black Rock was clearly aimed at the rock market, and endorsed in the catalog by Buddy Cage of New Riders of the Purple Sage.

[14] Sho~Bud Pedal Steel Guitars (distributed by Gretsch), Brochure, ca. 1981. Personal collection of the author.

Less is More: the Triumph of the E9

As the number of pedal steels increased, the instrument's identity came to be aligned with the single-neck instrument with E9 tunings and a small number of fixed devices. Consequently, a periphery of simplified pedal steel playing formed around the center of professional activity, leading to a narrower understanding of a "typical" pedal steel. The C6 tuning became more rare as the E9-centered sound that grew out of Isaacs's "Slowly" configuration became more common. Among the factors that ensured the dominance of the E9 tuning was a decision made in 1972 by one of the highest profile steel players of the time. This decision, made by Lloyd Green—among the busiest session players in Nashville, and thus one of the most listened to, is a rare example of a player formally "closing" his instrument (see Chapter Three). This calculated personal move encapsulated a long-brewing change in the overall conception of the instrument. Since the 1950s, the double-neck pedal steel had been the professional standard. The E9 had been considered an entry point, suitable for students to focus on, but the mark of a true professional was fluency on both necks. In fact, the E9 was looked on with a slight disdain as the "money neck"—what you had to play to pay the bills. The C6 "jazz" neck (primarily meaning western swing, but increasingly incorporating other jazz styles) was considered a more serious endeavor, linked to the more "authentic" (i.e. less commercial) western swing and honky-tonk styles. For one of the top professionals to come out and say that not only was the C6 not a profitable pursuit, but that the E9 fulfilled his musical needs, marked a major change in the very definition of the pedal steel.

Following this decisive turn, Green went as far as to dismantle the second neck of his instrument, removing the strings, hardware, and fingerboard, and replacing them with

a padded armrest. Soon after, Sho~Bud began producing the L.D.G. model, providing the exemplar for a new pedal steel design, the SD-10 (single-neck, double-body, ten strings). In addition to a reduction in weight and maintenance needs, the benefits of this model include the retention of both the resonance of a double-neck body and the more ergonomic placement of its knee levers. The SD-10 design proved so popular that many other steel guitar manufacturers began producing them. The Emmons version was called "the Loafer," perhaps as a dig against those who might rest their arms on the pad (it is considered poor technique to rest your arms on the C6 neck when playing E9).[15] The enduring popularity of the SD-10 design is attested to by the fact that almost all steel guitar manufacturers since the 1980s include it in their standard catalogs.

By the end of the 1970s, the pedal steel's dominant technological script had changed, valorizing the refinement of tools used in an increasingly standardized way rather than the development of tools for the exploration of possibilities. A bifurcation emerged between the technology needed for professional use, and that required for amateurs and beginners. At the same time, the reduced capacity of entry-level instruments was echoed by the emerging attitude that the maximized professional models were not actually required to make music at the professional level. As a result, the core identity that was established for the modern pedal steel was even more narrowly defined than ever, and the Nashville E9 tuning became standard. The end of the 1970s also marked the end of the boom of interest in the instrument.

[15] Emmons Guitar Company, Inc., Catalog no. 734, ca. 1976. Personal collection of the author.

Steel Refinement: Patents Since 1976

The shift in the overarching approach to the pedal steel's mechanical design from a process of innovation to one of refinement can be seen in the patents granted after the mid-1970s. Almost all of these patents show the influence of David Jackson's design for the Sho~Bud Pro series (which in the late 1970s included the Pro I, the Pro II, the Pro III, and the Super Pro), which established the "all-pull" changer as the *sine qua non* of a professional pedal steel. Their primary features centered on a setup that was easy to adjust and tune, and included the capacity for each string to be raised up to three separate pitches, and lowered to two pitches.[16] Just as in the 1960s, manufacturers sought to distinguish their designs with unique features (ranging from the cosmetic to the functional) that they trumpeted in their catalogs and advertising materials.

One indicator of the dominance of the all-pull design was the introduction of the Emmons LeGrande Custom designed by Emmons and Ron Lashley. The LeGrande was advertised as offering improvements not only on the push-pull, but also on existing all-pull designs.[17] These improvements included more efficient pedal action, easier setup changes, and an increased "chord flexibility" due to a new "split tuning" mechanism. Patented by Lashley in 1977, the split tuning system allowed players to achieve a third, tunable pitch from a string that was raised by one pedal and lowered by another.[18] This advancement was pronounced by Emmons himself to be "a very significant step toward achieving the ultimate pedal system." For example, raising the B strings to C# with the A

[16] Differences between the models included the number of knee levers and the material of the necks (wood vs. aluminum). Sho~Bud Pedal Steel Guitars (distributed by Gretsch), Brochure, ca. 1981.

[17] Emmons Guitar Company, Inc., Advertisement, *Steel Guitarist* 1 (January 1979): 5.

[18] Ronald T. Lashley, *Pedal Guitar*, U.S. Patent 4,157,050, 6 June 1977 (5 June 1979).

pedal and lowering them to B-flat with the LKV lever simultaneously resulted in a perfectly in tune C natural. This particular split can be seen as an automation of the existing technique of activating the A pedal halfway, and is useful for producing a minor triad at the normal pedals-down position, and an augmented triad in the open position (see Figures 3-16 and 3-18 for examples of the latter use). Lashley's patent notwithstanding, split tunings could be achieved with almost any all-pull system, provided that there were multiple lowers available, and the means to fine-tune this feature are included on instruments by many post-1980s manufacturers. The other all-pull design patented by Lashley in the late 1970s sought to improve on the Sho~Bud model by decreasing the points of friction in the changer and therefore facilitating a more secure return to pitch.[19] With the introduction of this second model, the name of the Emmons all-pull model was changed to the Lashley LeGrande.

The only patented design of note in the 1980s was an unusual instrument designed by Paul Franklin, Sr., a maker who got his start at the Sho~Bud factory before launching his own company in 1978. Franklin's guitars combined a sophisticated all-pull mechanism, which purportedly could raise or lower each string by an entire octave, with the unique tonal qualities of a formica-covered body, similar to the Emmons push-pull.[20] His 1986 patent, however, was for an entirely different take on the pedal steel: a design that fused the E9 pedal steel with the acoustic sound production and distinctive tone of a

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[19] Ronald T. Lashley, *String Mounting Apparatus*, U.S. Patent 4,175,467, 22 May 1978 (27 November 1979).

[20] Franklin's instruments are championed by his son, the renowned session musician Paul Franklin, Jr., who discusses their capabilities in Cal Sharp, "Paul Franklin: New Directions in Pedal Steel," *Guitar Player* 14, no. 10 (October 1980): 44.

resonator guitar.[21] Dubbed the "Pedabro," this novel instrument can be heard on several hit songs of the late 1980s, including Randy Travis's 1987 single, "Forever and Ever, Amen." Only a few Pedabros were ever made, due to the high cost and availability of electronic effect pedals that could simulate the resonator sound with a standard pedal steel. That this unusual design is the only significant patent during this period is indicative both of the stability of existing technology and a shift in business models away from the large-scale operations of the late 1970s to smaller companies with fewer workers and a lower output of instruments, a trend which continues in the early twenty-first century.

Very few pedal steel patents were applied for in the 1990s, with the only major designs focused on further refinement of the tuning and tone of the all-pull design. A 1996 design by Ron Lashley added a unique feature to his newest LeGrande design, the Lashley LeGrande III, which he dubbed the "Counter Force Anti Detuner."[22] The purpose of this mechanism was to provide a microtonal adjustment to a string in order to compensate for small but noticeable changes in tension caused by the activation of pitch-changing devices on adjacent strings. The string most commonly affected by this problem is the fourth string, E, which tends to drop slightly in pitch with the activation of the A and B pedals. Prior to this compensating mechanism, players attempted to obviate this issue by tuning the E string slightly sharp, ideally by a small enough margin that it was not discernible. With Lashley's invention, however, the open string could be tuned

[21] Paulie H. Franklin, *Stringed Musical Instrument*, U.S. Patent 4,704,935, 3 October 1986 (10 November 1987).

[22] Ronald T. Lashley, *Pedal Guitar*, U.S. Patent 5,883,320, 15 July 1996 (16 March 1999).

exactly to pitch, and the counter-force mechanism would engage along with the pedals, raising the string's pitch by the few cents need to make it in tune.

An exemplar of the refinement focused on the all-pull design in the 20 years between the Super Pro and the turn of the twenty-first century comes from the workshop of Texas-based Carter Steel Guitars. One of the most prolific makers of the 1990s and early 2000s, Carter was founded by designer Mervin "Bud" Carter, who began designing and building pedal steels with MSA in the late 1960s. The 1990s Carter steel offers the quintessential vision of the all-pull pedal steel, offering "*maximum* intonation and sustain…as well as extremely *fast and easy* playing action," the result of "highly-advanced technology *and* careful design" supported by "many years of computer and field studies." Aside from carrying forward the rhetorical traditions of earlier makers, Carter steels featured a triple-raise, triple-lower mechanism (patented in 1999); a "quick-change" system for adjusting setups; split tuning; and the most up-to-date tuning machines available.[23] Prior to their shutdown of business in 2010, Carter also offered the "Carter Starter," a student model that reflected a raising of the bar for the minimum features thought needed to enter the world of the pedal steel, with a standard three pedals and four knee levers.

Another maker that came to the forefront of the field in the 1990s and 2000s was ZumSteel, whose designer Bruce Zumsteg had sought to combine the best features of the Emmons push-pull and the all-pull concept since the late 1970s. Patented in 2005, Zumsteg's "Hybrid" changer uses a "tone ring" (actually a rectangular metal piece that surrounds the changer) to "better transfer the string resonance and related overtones into

[23] Mervin E. Carter, *Pitch-changing Device for a Pedal Steel Guitar*, U.S. Patent 6,002,075, 6 April 1999 (14 December 1999); Carter Steel Guitars, brochure, ca. 1994.

the sound board of the steel guitar.[24] This design was well received by professional musicians, as seen by its adoption by players such as Mike Auldridge, Hal Rugg, and even Emmons himself. The rhetoric surrounding the ZumSteel design demonstrates the longevity of trend established by the Emmons LeGrande, in which the functionality of the all-pull design was pitted against the sonic qualities of older designs such as the original Emmons push-pull.

In a circuitous twist, one of the furthest departures from the all-pull design came from David Jackson himself, whose 2008 design prioritizes tonal considerations over the flexibility of its setup. Although now operating under the name of Jackson Steel Guitars, Jackson maintains his claim to the legacy of Sho~Bud (including his father's designs as well as his own) with the slogan "Pulling Strings Since 1955."[25] Alongside a new version of the Super Pro (the Pro IV), Jackson offers the Shot Jackson Classic (previously called the Madison '63), a model that seeks to recreate the tone of the original Sho~Bud Permanent model, while "standardiz[ing] the tuning to simplify the playing."[26] Incorporating several new mechanical features, the Classic sidesteps the difficulties of maintaining the balance of the three states of the all-pull changer by splitting the raising and lowering functions between the two ends of the instrument, keeping the raises on the bridge side of the instrument but moving the lowering action to the side of the tuning

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[24] D. Bruce Zumsteg, *Pitch Changing Arrangements for Pedal Steel Guitar*, U.S. Patent 7,247,779, 23 February 2005 (24 July 2007); ZumSteel Pedal Steel Guitars, "Zumsteel *Hybrid* Changer," http://mountainbiofuel.com/ zumsteel/hybrid.cfm

[25] Jackson Steel Guitars, "History," http://jacksonsteelguitar.com/history/

[26] Candice Dyer, "'Pulling Strings Since 1955: Jackson Steel Builds on A Legacy of Twang," *Georgia Music* 25 (Summer 2011): 21.

machines.[27] Claiming that these designs result in "the Ultimate Sound and precision," Jackson's design ran counter to the "universal" aspirations of the 1960s and 1970s, sacrificing the flexibility of the all-pull changer for a more stable system at the cost of the openness of the system. Although the raises remain manipulable, the lowers are built in to the instrument, and must therefore be assigned before manufacture. The self-limiting nature of this design affirms that the identity of the pedal steel is not necessarily rooted in its capacity for openness, but in its perfection of the closed system of the standard E9 and C6 tunings.

Closure as Consensus: Co-constructing a Pedal Steel Community

From Orality to Literacy

A major change in the flow of information about the pedal steel occurred in the 1960s, as the vehicle for the transmission of these ideas increasingly changed from recordings to print sources. The change from orality to literacy had much the same effect as in other traditions of music, shifting the emphasis from performance and listening to theory, analysis, and historiography. One of the strongest effects of this shift was the establishment of a narrative that laid out the specific set of musical, technological, and cultural scripts that would define the pedal steel at the end of the twentieth century. This narrative represented a consensus—sometimes explicit, but more often implicit—that was established among makers, players, and listeners.

[27] David H. Jackson, *String Puller for String Instruments*, U.S. Patent 7,465,860, 19 July 2006 (16 December 2008); David H. Jackson, *Pitch Adjustment Device for String Instruments*, U.S. Patent 7,759,568, 19 July 2008 (20 July 2010); David H. Jackson, *Pitch Adjustment Device for String Instruments*, U.S. Patent 7,645,927, 28 August 2008 (12 January 2010).

The first steps towards pedal steel literacy came from the efforts of two amateur musicians and pedal steel enthusiasts in the 1960s. The first of these was Paul Graupp, an amateur steel guitarist who developed a fascination with the pedal steel as it emerged in the late 1950s.[28] In 1958, a touring musician introduced Graupp to the new Fender 1000. By the time he was able to purchase one, however, he was stationed at an Air Force Base in England. After writing Fender for instructional material and finding that they had none, he was asked to fill the gap by writing for Fender's in-house magazine, *Fretts*. Beginning in 1962 and continuing through 1967, Graupp's personal experience with the pedal steel was documented in a series of articles that included interviews, record reviews, responses to correspondence, and Graupp's own attempts to link the pedal steel with what he knew of music theory.

Over the five years of his writing for *Fretts*, Graupp interviewed numerous steel guitarists, including Jerry Byrd, Jimmy Day, Lloyd Green, Hal Rugg, Weldon Myrick, Maurice Anderson, Curly Chalker, and others, discussing their recordings and providing charts of their setups. In doing so, he helped facilitate a shift in the pedal steel world from an aura of competitiveness and secrecy (evidenced by the front panels of early Bigsbys and Emmons's removable fretboards) to one where an open exchange of information drove the tradition forward.

Following in Graupp's footsteps was Tom Bradshaw, an amateur player from Washington State, who had purchased a Sierra pedal steel in 1964.[29] Like Graupp,

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[28] Graupp's writings for *Fretts* magazine are reprinted in Paul Graupp, ed., *Pushin' Pedals: The Steel Guitar Writings of Paul Graupp* (Concord, CA: Pedal Steel Guitar Products, ca. 1977).

[29] Bradshaw published an anthology of his writings in the late 1970s. Tom Bradshaw, ed., *Pedal Steel Workshop and Other Writings of Tom Bradshaw* (Concord, CA: Pedal Steel Guitar Products, ca. 1977).

Bradshaw cast a wide net looking for information, in fact using Graupp's articles to generate leads for people to correspond with. His first attempt at writing about the pedal steel was a chord construction chart that he began selling after several of his correspondents requested copies. As his network grew, Bradshaw teamed with Maurice Anderson to host a steel guitar convention in Dallas in July 1967. This was followed the next year by a larger show near San Francisco. At this show, Bradshaw met L.V. "Bud" Eastman, who was just about to publish the first issue of his periodical *Guitar Player*. Eastman invited Bradshaw to submit an article about the exposition, and Bradshaw ended up writing for the magazine until 1976. In addition to interviews with major steel players, Bradshaw also wrote a regular column entitled "Pedal Steel Workshop," in which he discussed such topics as scales, the (supposed) futility of building your own pedal steel, the twelve-string universal tuning, pickup installation, and other technical issues. Bradshaw also coined the term "copedent" to refer specifically to charts that showed a pedal steel's tuning and pedal configuration. In addition to these contributions, Bradshaw's entrepreneurship was instrumental in establishing the larger pedal steel community, which is discussed below.

While the writings of Graupp and Bradshaw helped to establish both the technical language of the pedal steel and a public record of the instrument's key players and developments, the first dedicated pedagogical materials emerged in the late 1960s, beginning with manuals published by Sho~Bud. The *New Sho~Bud Pedal Steel Guitar Course* was published in 1969, and was intended to be comprehensive course, covering both pedal steel technique and basic musical terminology.[30] Its author, DeWitt Scott,

[30] As such, it is very similar to the Hawaiian guitar instruction materials discussed in Chapter One. DeWitt Scott, *The New Sho~Bud Pedal Steel Guitar Course*.

begins with the basics of right and left hand positions and proceeds to introduce the tuning of the instrument, in this case the E9 chromatic tuning, with three pedals and one knee lever—the minimal configuration used on student models. After introducing the concept of tonic, subdominant, and dominant seventh chords, Scott provides a series of chord progressions, scale exercises, and introduction figures, followed by intabulations of the songs "Honky Tonk Angels," "I'll Be All Smiles Tonight," and "Danny Boy." Scott uses a tablature that, as for the guitar, uses numbers to indicate the frets at which to play and indicates the action of the pedals with a graphic symbol placed above the tablature staff.

While Scott's manual is customized to match both the Nashville E9 setup and its musical milieu, the first pedal steel manual published by a major music publisher, Don Sharp's 1972 *Pedal Steel Guitar Method*, presents a highly idiosyncratic setup and notation.[31] Apparently conceived with a Fender 800 model pedal steel in mind (ten strings and four pedals), the setup used features the standard A and B pedals, but uses a half-step lower on the fifth string for the C pedal, and a combination of a second and sixth string lower on the fourth. As he had little exposure to any pedal steel music, Sharp built his method around basic chord progressions and self-composed tunes, all written in a confusing chord symbol based notation. Although this book tells very little about the pedal steel's actual use, it is worth noting that it was likely the most available source of material at the time, begging the question of whether it had any measurable influence.

Whereas Sharp's method exhibits little awareness of the history of pedal steel, perhaps the strongest written expression of the core pedal steel tradition came just three

[31] Don Sharp, *Pedal Steel Guitar Method* (Pacific, MO: Mel Bay Publications, 1972).

years later with the publication of Winnie Winston and Bill Keith's *Pedal Steel Guitar*.[32] Issued by Oak Publications, whose catalog largely reflects the tastes and aesthetics of the folk revival,[33] Winston's book did more than any other source to codify the prevailing configurations, reinforce the beginnings of a canonized repertory, and, most importantly, to offer a narrative that defined the aesthetics of the instrument in terms of the building blocks of its technique. Although the majority of the instructional content is restricted to the three pedals and one knee lever that were standard to student models, Winston includes a brief introduction to the C6 neck and an appendix consisting of the copedents of thirty-two professional players. The musical content is supplemented throughout with photographs of important players and practical advice on musicianship, and the appendices include advice on buying an instrument and the necessary accessories, alternate tuning methods, explanations of the most common types of mechanism and tips on troubleshooting their operation. Of particular importance are sections devoted to a short history of the instrument and a list of recommended recordings the ties the major players to the artists whose sound they helped define. As a whole, Winston's manual serves as the primary document of the literate, technology savvy, and historically aware tradition that governed the pedal steel from the mid-1970s on.

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[32] Winston and Keith, *Pedal Steel Guitar.*

[33] Other Oak publications include Jean Ritchie, *Jean Ritchie's Dulcimer People* (Oak Publications, 1975); Andy Kaufman, *Beginning Old-Time Fiddle* (Oak Publications, 1977); Ken Pearlman, *Melodic Clawhammer Banjo* (Oak Publications, 1979); Peter Pickow, *Hammered Dulcimer* (Oak Publications, 1979); and Dallas Cline, ed., *How to Play Nearly Everything From Bones to Spoons to Washtub Bass* (Oak Publications, 1977).

The Pedal Steel Canon

As the flow of pedal steel information changed from an oral tradition to a written one, patterns of learning the pedal steel shifted. Especially during the early years of the pedal steel's growth, when players learned by listening to records, the variability of learning by ear led to a variability in style and technique. With the transition to notation-based learning, the impetus shifted to the exact recreation of the playing of others. This trend was amplified by the nature of the notation, as tablature is perhaps the most prescriptive form of notation, giving exact instructions for physical movement.

The spread of the mimetic impulse was driven by another type of instructional material that became popular in the 1970s: "courses" that consisted solely of intabulations of a particular player's recordings. These materials were often self-published by players and sold through mail order either directly from the player or through the pedal steel manufacturers' catalogs. Unlike the manuals described above, these courses generally give scant instruction beyond a guide to reading the specific tablature conventions used. The mimetic impulse is seen most strongly in the fact that these courses often come with two sets of recordings: one featuring the player's rendition of the music, and one consisting of the same backing track without the pedal steel lead.[34] Amateur players were thus able to play the role of the recording musician.

The shift to a written approach to learning the pedal steel and learning about the instrument fostered a codification of many aspects of its previously fluid scripts. Some

[34] Just as the courses were independently manufactured and distributed, these recordings were largely made outside of the auspices of the music industry. They did, however, often feature studio musicians that were friends of the steel players, and sometimes other steel players performing on guitar, bass, and other instruments.

players are critical of tablature for its tendency to discourage learning by ear.[35] However, as most pedal steel tablatures do a poor job of representing rhythm, players are forced to combine reading with close listening if they are truly seeking to imitate the recordings. Even with listening, however, the timing element of performance is left open to more variance than the selection of notes. In this way, the fluctuations in execution that ethnomusicologist Charles Keil terms "participatory discrepancies" creep back into the mix, albeit to a lesser extent than in oral traditions.[36]

While the innovations of the first generation of pedal steel players were often documented primarily in the background of the commercial recordings of other artists, they were later brought to the forefront in the concentrated format of instrumental albums. Solo steel guitar albums provided a vehicle for listeners to access the full gamut of the virtuosity of professional players. The material included on these albums also reflects both the engagement of pedal steel players with the flow of popular music and the formation of a core repertory of songs associated with the instrument. The makeup of this canon was influenced by the selections made by some of the key figures discussed in this chapter. Winnie Winston's guide to listening provided a list of recordings that were made even more influential due to their inclusion in what became the "bible" of pedal steel. Tom Bradshaw, as one of his entrepreneurial endeavors, founded a record label dedicated to reissuing hard to find recordings by great steel guitar players. This series, called "Steel Guitar Classics," shaped the canon both in terms of defining this list of

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[35] This is also an issue for some jazz musicians. See Berliner, *Thinking in Jazz*, 98.

[36] Charles Keil, "Participatory Discrepancies and the Power of Music," *Cultural Anthropology* 2, no. 3 (August 1987): 275–83.

classics and through the simple expediency of making a select set of recordings available to a great number of players. Bradshaw's re-releases also mark a shift from the production of solo recordings by major labels (such as Emmons's and Day's early-1960s recordings) to the expansion of dedicated independent labels and self-produced recordings that formed a new niche market for pedal steel recordings. The canonical pedal steel was also defined by what it is not. The dismissal of the efforts of country rock players—particularly Jerry Garcia, who drew heavy criticism as a dilettante—served to reinforce the core values of pedal steel as a country instrument.

The Pedal Steel Community

Perhaps the most important aspect of the institutionalization of the pedal steel was the formation of a broad community of listeners and amateur players who promoted the work of professional players and drove the business of makers. The groundwork for this community can be found in the instrument clubs, associations, and societies that were popular in the late nineteenth century, as well as the fan clubs that formed around celebrity performers. Through newsletters, gatherings, and now websites, these organizations foster the flow of information among players, and provide a way for amateurs to communicate with the professionals.

The stage for a more unified community of pedal steel enthusiasts was set by Graupp and Bradshaw, whose correspondence established the lines of communication among amateur players and professionals alike. The gatherings that Bradshaw organized in the late 1960s precipitated interest in the instrument and established a tradition of such

events that has continued into the twenty-first century.[37] In St. Louis, DeWitt Scott hosted the first International Steel Convention in 1971, and founded the Steel Guitar Hall of Fame in 1978.[38] Following the pattern of the Hawaiian guitar explosion of the early twentieth century, numerous small groups of amateurs formed local and regional organizations dedicated to the pedal steel (and sometimes steel guitar in general), hosting their own social and musical events.

The ultimate extension of these communities can be found on the Internet, where the *Steel Guitar Forum*, a website established in 1997, had 12,080 registered users as of 2012.[39] Through this website and other smaller sites like it (including ones in French, German, Dutch, and other languages), steel guitarists form an imagined community, in which they exchange information of variable reliability and debate historical minutia and music industry trends. These sites have been instrumental in defining, refining, and perpetuating the cultural scripts of the pedal steel guitar in the twenty-first century.

Conclusions

In just a quarter of a century, the pedal steel guitar evolved from a niche instrument used by only a handful of players, with no fixed form or function, to the central object of a full-fledged industry and a widespread community. The speed of the pedal steel's mechanical, musical, and cultural metamorphosis was fueled by other

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[37] The growth of these events was immediately apparent, as the 100-strong attendance of Bradshaw's July 1967 steel guitar show in Dallas was followed by a crowd of 500 (including fifty steel players) for the first West Coast Pedal Steel Guitar Show in May 1968. Bradshaw, *Pedal Steel Workshop*, 2–3.

[38] Scott's efforts are centered at his store, "Scotty's Music" (www.scottysmusic.com).

[39] bb.steelguitarforum.com

technological changes of the twentieth century. First and foremost, the growth of the recorded music industry enabled the transmission of not only the pedal steel's sounds, but also the mechanical ideas that enabled them. Although some aspiring players were able to reverse engineer the technology of the pedals, the vast majority were willing to buy an instrument, which led to a boom of pedal steel manufacturing, including the introduction of student-quality pedal steel. Along with these instruments, companies worked to create instructional materials, which fostered a shift towards a written rather than an oral tradition. This change was abetted by the appearance of a public discourse about the instrument that was centered on pedagogy and historiography. The increase in discourse fostered the growth of a community of amateur players and enthusiasts, which shadowed the community of professional players in which the pedal steel evolved. All of these changes did indeed contribute to the closure of the instrument's form and function, as a manifestation of the growing consensus about what the pedal steel was, and what it did. This consensus in no way precluded the continued development of new scripts for the instrument's use, however, but rather increased the profile of the instrument and spurred new ideas even as it bolstered those that had been established since the early 1950s.

CONCLUSION

THE OPEN PEDAL STEEL

The events of the 1970s fostered the effective closure of many aspects of the pedal steel guitar's mechanical, musical, and cultural scripts. However, just as the individual players of the 1950s and 1960s pursued their own personal scripts while navigating the instrument's developing technology and the demands of the music recording industry, players after the 1970s were equally able to exercise their individual agency in deciding their approach. Some steel guitarists continued to operate within the cultural scripts of the country music industry, while others pursued different paths for their playing. The opposite ends of this spectrum can be seen in the work of two players: session musician Paul Franklin and avant-garde musician Susan Alcorn. A player whose approach to the pedal steel demonstrates the perpetual dialogue between individual musicianship and the Nashville studio system, Franklin followed in the footsteps of Lloyd Green, Pete Drake, and other dedicated session players to become one of the most recorded pedal steel guitarists of the 1990s and 2000s. Alcorn, conversely, although a long-time student of the country pedal steel tradition, found herself pulled in an entirely different direction, and brought the instrument into the realm of avant-garde jazz and free improvisation through both solo compositions and collaborations with like-minded musicians. Together, these two players reflect a continued transformation of the pedal steel tradition grounded in the

juxtaposition of new musical material with the core technical features and sonic aesthetics that define the instrument.

Paul Franklin

Born in 1954, Paul Franklin followed a remarkably similar trajectory to Emmons, Green, and others, beginning on the steel guitar at a very young age.[1] However, after only a brief six months on the lap steel, he quickly moved to a Fender pedal steel and developed a technique centered on the pitch-changing devices established by the previous generation of players. As he states in a 1996 interview, "The steel guitar was already pretty much standardized by the time I moved to Nashville. All I had to do was learn how to play it."[2] From the start, however, Franklin pursued a different conception of the pedal steel, seeking to develop his own voice by drawing inspiration from the sounds and techniques of other instruments, from saxophones to synthesizers, and studying jazz theory texts such as George Russell's *Lydian Chromatic Concept*. Like Emmons, Franklin explored the different musical scripts afforded by the C6 and E9 necks, particularly their different capacities for single-note melodic playing. He also propelled the steel into new territory by playing with both Dire Straits and Steely Dan, two rock groups known for their virtuosic musicianship.

Although he claims merely to stand in the shadow of the giants before him, Franklin's innovations on the E9 neck in particular have been widely adopted. These include not only pick blocking and atmospheric chimes, but also four unique pitch

[1] Biographical information drawn from Cal Sharp, "Paul Franklin"; and James Sallis, "Paul Franklin: New Breed Steel Player," *Steel Guitarist* 6/7 (May 1981): 26–34.

[2] Phillips, "Masters of the Pedal Steel," 38.

changes. Several of these are not without precedent, but were clearly popularized by Franklin's use of them on recordings (see Figure C-1).

String	1	2	3	4	5	6	7	8	9	10
Pitch	**F#4**	**D#4**	**G#4**	**E4**	**B3**	**G#3**	**F#3**	**E3**	**D3**	**B2**
Pedal A					+C#4					+C#3
Pedal B			+A4			+A3				
Pedal C				+F#4	+C#4					
Pedal P					-A3	-F#3				-A2
LKL-F				+E#4				+E#4		
LKR-D		-D4/C#4							-C#3	
LKV (1)						-E3				
LKV (2)						+B3				
RKL-E				-D#4				-D#4		
RKR-G	+G#4	+E4					+G#3			

Figure C-1. Paul Franklin's E9 tuning, ca. 2000.

The first of these is his fourth pedal, now popularly known as the "Franklin pedal," which lowers the B strings to A and the low G# to F#. He uses this pedal for several harmonized melodic gestures, including one flowing from the pedals-down major triad to an added sixth chord on strings 4, 5, and 6 (e.g., C-E-G–A-C-G), or sometimes just on strings 4 and 5, particular as chimes. The second is the combined raises of the first and second strings, which are often played in isolation and bent into unisons with strings 3 and 4. Another device based on producing a unison note with another string is the first of Franklin's vertical knee levers, which raises the sixth string from G# to B for a unison with string 5. He frequently uses this as the beginning of a contrapuntal gesture, much like Emmons's use of the raised B string and lowered second in Ray Price's "The Healing Hands of Time" (Chapter Two, Figure 2-16). An alternate vertical knee lever change is found on one of his other pedal steels, and lowers string 6 a major third from G# to E. Franklin uses this in conjunction with a pedals-down major triad, which includes

the G# raised to A, releasing the second pedal and activating the vertical lever to drop the tonic of the triad to the dominant below while sustaining the third (and sometimes fifth above).[3] This change, in particular has seen less adoption by other players, as the dramatic effect of dropping a fourth is so distinctive that it has limited application outside of recreating Franklin's style.

Almost all of these changes can be heard in a solo played by Franklin on a live video of the Players, a band comprised entirely of top Nashville session musicians.[4] On guitarist Brent Mason's ballad, "My Little Ballerina," Franklin showcases the melodic possibilities of his setup in a style that integrates musical and mechanical ideas in a manner similar to Emmons's "Danny Boy" (see Chapter Three). As seen in Figure C-2, Franklin begins in the lower register of the instrument, using the A pedal and two of his knee levers to execute a diatonic figure whose melodic simplicity belies the complicated choreography of his legs and foot (m. 1). He continues in the second measure with a combination of bar and pedal action that hints at his mastery of the speedpicking techniques pioneered by Weldon Myrick (see Chapter Two, Example 2-17). Following this melody that ascends through a IV–V progression, he arrives at the D-F# dyad of the I chord slightly ahead of m.3, and uses his vertical knee lever to dramatically drop from the pedal-down D to the A below and back again before launching into a passage harmonized in parallel thirds that launches him into another IV-V in a higher register. In m.5, he exploits the available unisons between strings 1 and 3, 2 and 4, and 2 and 5, to ornament

[3] This change can be heard prominently in Alan Jackson's "Meat and Potato Man" (*When Somebody Loves You*, Arista Nashville 69335, 2000), George Strait's "My Life's Been Grand" (*The Road Less Traveled*, MCA Nashville 170220, 2001); Tim McGraw's "You Used to Know Somebody" (*Set This Circus Down*, Curb Records 78711, 2001).

[4] This video is posted on Franklin's website, http://www.paul franklin.com/ players.html#VIDEO%20CLIPS

a simple scalar descent from F# to B over the vi, carrying on to the lower G and the beginning of a final IV-V. After his cadence on the I chord in m.7, Franklin plays a multiple-octave-spanning gesture in his characteristic chimes style, which features a pure crystalline sound and an unaccented attack (via the volume pedal), and ends the solo with a slow activation of his fourth pedal, bending an E down to the tonic D note while sustaining the A above.

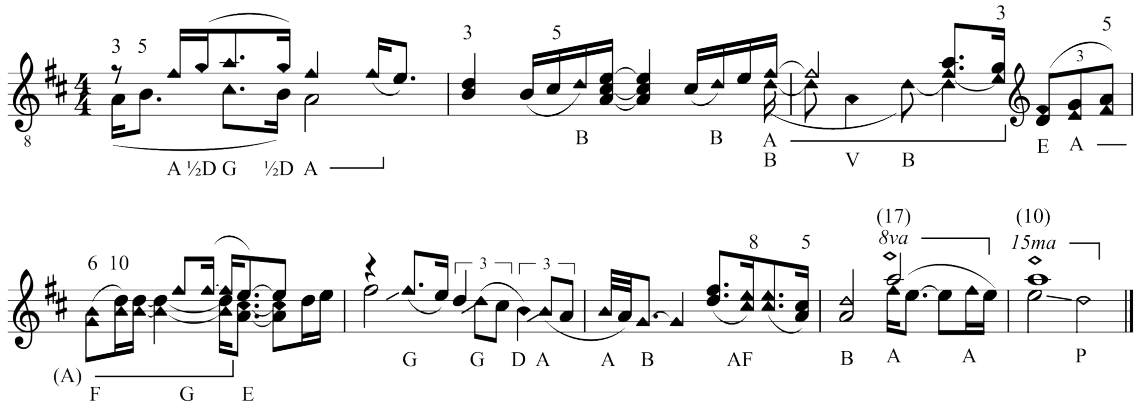

Figure C-2. The Players, "My Little Ballerina" (rec. ca. 2006), pedal steel solo by Paul Franklin [2:02–2:32].

As seen in this example, Franklin's E9 setup and style carried the pedal steel farther than ever from the "rusticity" that pop-country crossover artists of the late 1950s sought to eschew. The precision of his playing also demonstrates a type of virtuosity that strikes a balance between the personal exploration of his instrument and the priorities of the Nashville recording scene of the 1980s and 1990s, where a standard of perfectionism not only focused on an elite group of dedicated studio musicians, but also fostered the development of electronic tools like the now ubiquitous auto-tune. On the other hand, Franklin's success in the commercial arena has allowed him to pursue other avenues for

his personal expression, including groups like the Players, where he and the other musicians are free to play as they like, and the Time Jumpers, a group of Nashville professionals (players and singers) who are dedicated to showcasing older country traditions from Western swing to Honky Tonk.

Susan Alcorn

Born to a musical family, Susan Alcorn was exposed to a wide variety of music from a young age, and her early fascination with the sound of the blues slide guitar was complemented by exposure to contemporary art music, jazz, and non-Western music.[5] After being exposed to the pedal steel in 1975, she began playing in the Chicago country music scene, where she quickly learned to balance the demands of the instrument with the listening skills required to participate in an environment of competitive professional performance. She followed the path of many aspiring players, listening to recordings by Emmons (she cites the *Black Album* as a major influence), Green, and Day, and others, as well as seeking out private lessons and workshops from Maurice Anderson and Jeff Newman.

After moving to Houston in 1981, Alcorn went even deeper into the country pedal steel tradition, performing regularly in dance halls, jam sessions, and sitting in with local

[5] Biographical information is drawn from Susan Alcorn, "A Short Musical Autobiography," http://www.susanalcorn.net/#!aboutt/vstc1=musical-autobiography; Kevin Macneil Brown, "New Directions in Pedal Steel Guitar: Three Conversations," *Dusted*, 13 September 2004, http://www.dustedmagazine.com/features/293; Bret McCabe, "Learning to Listen: Susan Alcorn Charms Stories Out of Her Pedal Steel Guitar," *City Paper* [Baltimore], 23 January 2008 http://www2.citypaper.com/music/story.asp?id=15125; and Spencer Grady, "Awaiting the Resurrection Of the Pedal Steel Guitar: Susan Alcorn Interviewed," *Quietus*, 1 September 2010, http://thequietus.com/articles/04879-susan-alcorn-interview-touch-this-moment.

and national acts.[6] At the same time, she studied jazz improvisation, and found that she was being pulled in a more expressive direction:

> There's a lot of improvisation in country music, but it's in small doses, and, like other tradition-bound forms of music, if you go too far out, you lose people, and soon find your way out of a job… Towards the end, I'd be playing note for note what everyone else played, but there was something about my phrasing that the other musicians (and the audiences) noticed that had escaped me and I was told, in no uncertain terms, that I had to play "correctly" or find somewhere else to play.[7]

Her dueling interests lead to a musical double life, rife with the disorientation of listening to free jazz icon Albert Ayler in the car on the way to country gigs.[8] Although she was also pursuing her interest in jazz by playing with "straightahead" jazz groups, she was encouraged through correspondence with pianist and composer Paul Bley to "throw away the real book" and to start to play outside of that box as well.[9]

After beginning to explore her own musical voice by composing and playing to mostly empty rooms with like-minded musicians, in 1990 she found a clear direction through the first of several collaborations with composer-performer Pauline Oliveros. Immersing herself in Oliveros's philosophy of "deep listening," Alcorn developed her

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[6] Alcorn Recounts her travails as a gigging pedal steel guitarist, playing with both bands of "weekend warriors" and ad hoc groups of professional players whose gigs devolved into one-upmanship in "The Road, the Radio, and the Full Moon," *Counterpunch*, 17 December 2005, http://www.counterpunch.org/2005/12/17/texas-three-days-and-two-nights/, reprinted in *Da Capo Best Music Writing* (2006), ed. Mary Gaitskill (New York: Da Capo Press, 2007), 184–97.

[7] Brown, "New Directions."

[8] McCabe, "Learning to Listen."

[9] The "real book" is a popular collection of notated jazz standards, which helped to define the jazz repertory in the 1980s. "Susan Alcorn," *Deep Listening Institute,* http://www.deeplistening.org/site/node/1055

own thinking about the building blocks of music, and how they intersected with her instrument:

> I wanted to hear the note and just every little thing about it. And in any instrument, and I think especially in steel guitar, I think of the strings as like—this is going to sound crazy—as little communities that are living, that exist as sentient beings or whatever. And each of them is like a little universe.[10]
>
> Every note, every musical sound and every instrument is alive. I try to give each of these room to breathe. My pedal steel guitar is a co-creator, in every sense of the word, with its own voice, so I try to give it space to tell its story. Also, for the notes, if you give them space, then they can begin to tell their story too. You can hear it in all the subtle inflections and in the universe of harmonics interacting with harmonics.[11]

A major revelation about the direction her music was taking came in 1997, when she was invited to participate in "12 Minutes Max," an event put on by Houston's DiverseWorks, "an experimental visual and performing arts organization."[12] Rather than gathering musicians and arranging one of her existing compositions to fit the time constraint of the event's premise, she decided to simply show up with her pedal steel and play extemporaneously. This performance proved to be a transformative experience, and Alcorn shifted her primary focus to solo performance. She continued to absorb and incorporate ideas from vastly disparate sources, including Gamelan, Japanese koto music, the *nuevo tango* of Astor Piazzolla, and the meditative compositions of Olivier

[10] McCabe, "Learning to Listen."

[11] Spencer Grady, "Awaiting the Resurrection."

[12] McCabe, "Learning to Listen."

Messiaen.[13] To create some of the sounds of these other musics, Alcorn turned to extended techniques and alternative bar materials, resulting in a style that resists categorization.

Operating in a totally different style than other players, Alcorn's music is even more of a dialogue with her instrument, as she is working against the ideas embedded in its design in addition to the normal hurdles of techniques and mechanics: "I suppose that, like all instruments, the physical limitations inform a sense of style, but for me they've been more of a frustration than anything else."[14] The pedal steel is rarely heard as a solo instrument, and the E9 tuning in particular developed with an emphasis on the higher register. Consequentially, Alcorn uses an extended twelve-string C6 tuning that incorporates some of the melodic features of the E9, while providing a substantial lower register.[15]

Although she consciously eschews conventional pedal steel techniques, their echoes can be heard in her playing alongside references to her other inspirations, as evidenced by a performance of her 2002 solo composition, "Twin Beams."[16] In the first two minutes of the piece, Alcorn presents a call-and-response between a single line melody in the upper register and lower, dense chordal passages. Her technical vocabulary includes the conventional techniques of bar slants (1:02) and chimes (0:55), but with the

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[13] She has recorded a solo arrangement of Messaien's vocal quartet, *O Sacrum Convivium*, and made reference to his orchestral composition, *Et exspecto resurrectionem mortuorm*, in her composition, "And I Await the Resurrection of the Pedal Steel Guitar."

[14] Brown, "New Directions."

[15] From high to low, her tuning is D4-E4-C4-A3-G3-E3-D3-C3-A2-F2-D2-C2, with 8 pedals and 5 knee levers. I have not been able to confirm her exact setup.

[16] Susan Alcorn, "Twin Beams," live performance, ca. 2007, http://www.youtube.com/watch?v=4x5UEEbnVQU

former obscured by atypical tonal structures, and the later played as an ornament to an already struck note rather than as a distinct tone (like Emmons or Franklin). In the second segment of the piece, beginning around 2:00, she uses her pedals to move from a two-string unison to a series of moving dissonances reminiscent of György Ligeti or Krzysztof Penderecki. She then invokes Ralph Mooney's hammer-on technique, casting spiraling lines harmonized in seconds for an effect reminiscent of the electric piano of late 1960s Miles Davis (2:30-2:40). At 3:44, she begins incorporating some of her extended techniques, using both the bar and her fingerpicks to strike the strings, invoking the both extended piano techniques of Henry Cowell and George Crumb and the bar slams of Speedy West. She then takes a second bar in her right hand, using its tip to strum and strike the strings creating a sound that combines a *col legno* string part with Cecil Taylor's percussive piano techniques. Switching back to conventional right-hand techniques, she combines the bar-tip percussion in the left hand with open-string harmonics for a frenetic, yet increasingly melodic shift that leads back to normally plucked notes at 5:00. Following a muted, quasi-tonal passage, she plays a sequence of ascending intervallic intervals answered by descending single-note glissandos. An exquisitely slow ascending glissando, fully displaying the unbound microtonal capabilities of the slide, leads to a recapitulation of the original theme at 6:20. After repeating the theme, the piece concludes with the unison-to-dissonance gesture from 2:00, ending with a slow resolution of the beats of a just-out-of-tune unison.

Alcorn's vision of the solo pedal steel as a vehicle for avant-garde composition and free improvisation is both a radical departure from the instrument's tradition and an extension of the creative impulses that fueled its development. After all, the inventors of

the first pedal mechanisms proclaimed their devices to exist in the service of searching for new musical ideas and previously unheard sounds. Later manufacturers like Sho~Bud, Emmons, and MSA (whose instruments Alcorn plays) advertised the "universality" of their devices, enabling any and all sounds that could be imagined. However, Alcorn clearly exists far outside of the easily recognizable pedal steel tradition, her skills recognized by many players, but hardly embraced by fans of Ray Price, Ernest Tubb, or Merle Haggard. Through these contradictions, she embodies both the closure of the instrument's cultural scripts and the perpetual openness that arises from any individual's interactions with a technological object.

Conclusions

Between the 1950s and the 1970s, the form and function of the modern pedal steel emerged, was explored, and became established as an instrument. What began as a specialized tool for professional musicians in the 1950s was transformed over the course of two decades into the object of enthusiastic use in the hands of amateurs. Instrument makers responded to the ever-increasing demand by altering their production methods to include the production of higher quantities of simplified models in addition to the refinement of professional quality instruments. The proliferation of amateur-oriented instruments created a need for new avenues for the dissemination of information regarding the pedal steel's history, techniques, and repertory. The answer to this need came in the form of written materials, both critical and pedagogical, and specially marketed recordings that together shifted the overall trajectory of the instrument's culture from the advancement-focused innovations of the professional players to the imitation

and re-creation of their best efforts. The pedal steel community thus grew to encompass not only the makers and professional players, but also amateur players of all skill levels, as well as enthusiasts who observed without participating. With the growth of this community emerged a consensus view of the instrument's essential nature that was embodied in the increasingly standardized instruments and codified in the generalized information contained in published texts. This consensus fueled an effective closure of the pedal steel guitar as a technological object with a corpus of mechanical, musical, and cultural scripts.

To say that a technology is closed, however, is itself an act of interpretation by its users. For the pedal steel, the most significant single interpretation of its closure was Lloyd Green's decision to focus solely on the E9 tuning, defining his instrument to be complete with a single neck. The power of his decision is only in part a reflection of his influence as player; more importantly, the reduction of the pedal steel form aligned with many of the practical aspects of a shift towards amateur culture. To begin with, single-neck instruments were easier to make, and cost less both to produce and to purchase. Further, the challenge of communicating the idiosyncratic techniques surrounding the pedal steel was halved by the omission of the C6 neck, whose pitch-changing devices perform entirely different functions than those of the E9. Lastly, Green's decision epitomizes the co-constructive nature of cultural scripts: he used the E9 more because it met the needs of the recording industry, and the producers needed to use it because of the success of players like Green.

The closure of the pedal steel provided not only a path for amateurs to follow, but also a status quo that acted as a springboard for further innovation. The unique personal

scripts of Paul Franklin and Susan Alcorn are just as meaningful for their contrasts to the consensus view of the pedal steel tradition as for their continuity with the experimentalism of the early inventors and innovators such as Buddy Emmons.

Ultimately, musical instruments are technologies that are defined by the extremes of both closure and openness; their dominant scripts serve as a guide for all of their users, and act as an essential contributor to the co-construction of each user's personal scripts. Looking beyond the pedal steel, I hope to apply the theoretical framework of co-construction and scripts to other instruments whose use in the twentieth century United States further illuminates the relationship between technology and its users. In particular, I wish to examine instruments in stages of development different from the initial (co-) construction of the pedal steel. The re-construction of the European lute tradition, for example, offers a way to study the "historically informed performance" movement as the site of a confrontation between modern ideas and the historical thought that is embedded in the technological artifacts of the fifteenth to eighteenth centuries. Turning to an established and unbroken tradition, the de-construction of the piano at the hands of American composers such as Henry Cowell, John Cage, and George Crumb shows the "opening" of the instrument's mechanical, musical, and cultural scripts as a means to challenge the values inherited from the European musical heritage that are embedded in its design. Through these avenues of inquiry, in addition to the present study, I hope to contribute to debates on the intersections of technology, art, and human knowledge, and to broaden our understanding of the indelible importance of technology to both the global history of music and human culture as a whole.

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