New Perspectives: A Reappraisal of the Lap Steel Guitar

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Abstract

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As a critical study accompanying a creative project which involves composition, rearrangement and recording featuring my work as a performer on lap steel guitar, *New Perspectives* is invested in both a historical consideration of the role of the instrument and an examination of how it can move away from the traditional context enabling application within new spheres of music. From the Hawaiian music boom of the early Twentieth Century to the mid-century rise of American country music, the lap steel's ascent and subsequent decline in popularity has since placed the instrument as a sideshow curiosity; a wealth of recorded material that has held the instrument in historical suspension, latterly used by musicians who choose to recreate recording techniques and stylistic accuracy from a bygone era. Whilst the roots of the instrument's invention and initial success are undoubtedly important, a select number of musicians have recently utilised the lap steel in fresh, vibrant and diverse directions with exciting results and with this consideration, *New Perspectives* seeks to further dispel the notion of an instrument which has an antiquated limitation. Highlighting an emphasis on performance and studio application, instrumental relationships are explored that show the lap steel's ability to both blend with sectional phrasing and to also take a strong melodic lead role. By eschewing traditional right-hand picking techniques that typically feature metal thumb and finger picks, the change of connection between the player's right-hand fingers to the string yields a particular sense of immediacy and brings a different dynamic response to the instrument's range; this coupled with switchable effects units, introduces a fresh sonic palate which undoubtedly enables future development, along with slide techniques influenced by conventional slide guitarists such as Derek Trucks and Ry Cooder. Along with furthering the instrument's lead role capabilities, *New Perspectives* also considers the possibility of using the lap steel for underlying textural application, with a look into individually recorded four-part harmony lines and the use of a technique which I believe to be a new approach to the instrument; chords are played in harmonics and then layered with reverb, distortion, tremolo, wah-wah and delay effects creating an almost ethereal sound. along with slide techniques influenced conventional slide guitarists such as Derek Trucks and Ry Cooder along with guitarist David Gilmour. Six recordings are submitted; three original pieces and three rearrangements that feature changes of ensemble size and genre setting; from large ensemble consisting of rhythm section and twenty-four-piece string orchestra through to

a simple Hammond organ trio. A reworking of late nineteenth century impressionist composer Erik Satie's piece *Petite Ouverture a Danser* looks at progressing the recordings of pedal steel guitarist B.J Cole from 1989. Each of the six pieces encourages further development whilst enabling the lap steel to have a more prominent role within the fields of composition, performance and recording. These recordings are to part of an E.P released on the Limefield Recordings label under the name of my established ensemble The Wagon Train, an ongoing project for both live and recorded work. The study therefore seeks to add to existing knowledge within this field whilst opening the possibility of further research alongside technical and musical exploration.

List of figures

Acknowledgements

I would like to thank the following people who have helped me undertake this research: My supervisor Dr. Robin Dewhurst, for his enthusiasm for the project, for his support, encouragement and patience. Sincere gratitude to the musicians who contributed to the recording process: John Ellis, Luke Flowers, Matt Owens, Richard Curran, Eryl Roberts, Pete Whittaker, Dave Hassell, Rick Weedon: To the studio engineers whose skill made the process relaxed and enjoyable: Will Falkiner, Steve Brown, John Maycraft and Steve Williams for mastering the recordings. To my Wife for her undiminished support and belief in my abilities, to my daughter for creating joy in times of darkness, my Mother and late Father for their constant support and belief, to Bill Frisell and Greg Leisz for their inspiration and introducing me to the lap steel through their recordings and lastly, to George Beauchamp for inventing the first electric guitar.

Declaration

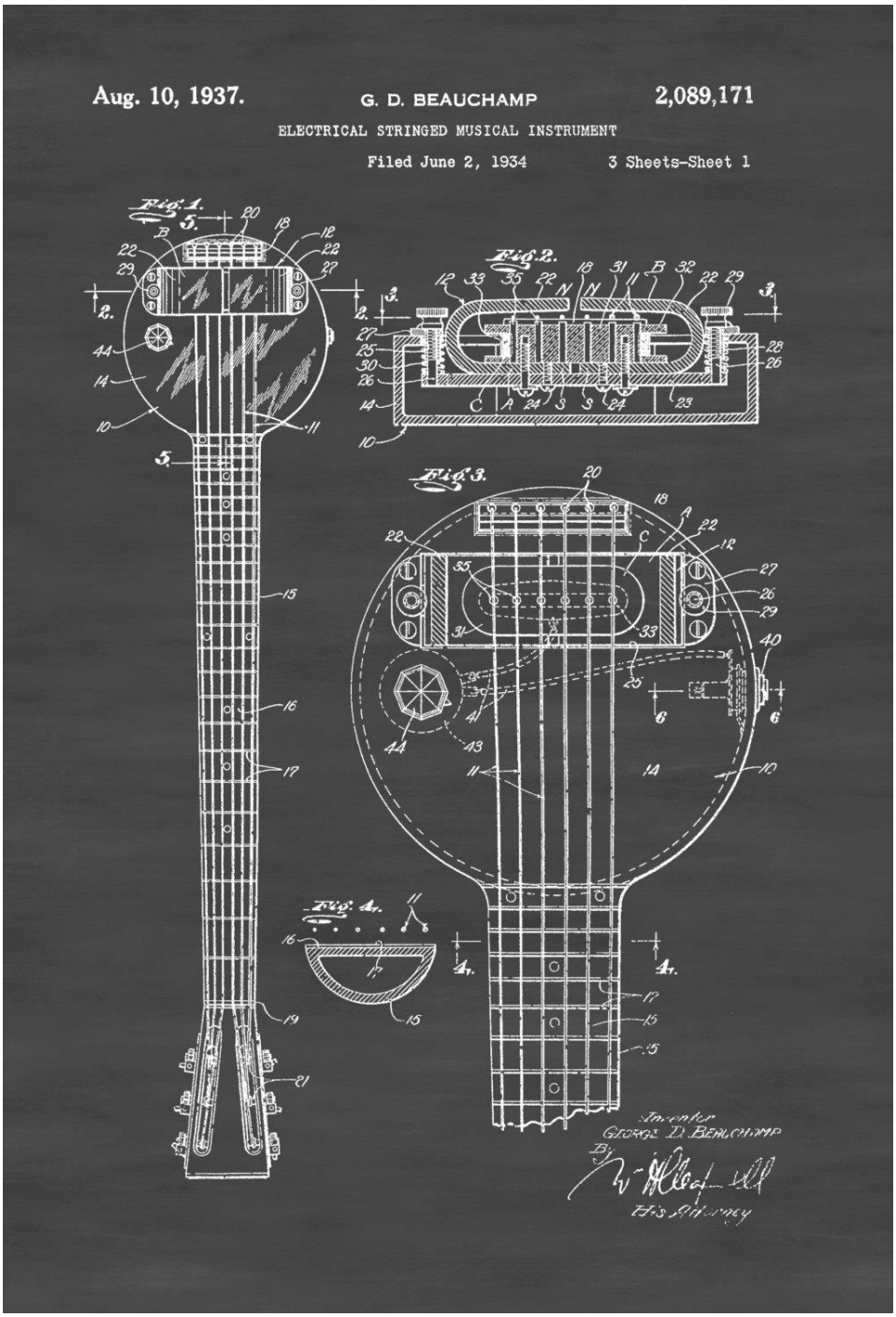
I declare that this thesis has been composed solely by myself and that it has not been submitted, in whole or in part, in any previous application for a degree. Except where states otherwise by reference or acknowledgment, the work presented is entirely my own.

S Buckley, March 2021.

Chapter 1

An introduction to the history of the lap steel

Figure 1



The lap steel has had a somewhat chequered history from being the first instrument to be successfully amplified in the early 1930s, to its role quickly diminishing during the 1960s, following the success of the pedal steel guitar. Its significance cannot however be ignored when we start to look at the creation of amplified sound for live performance and to see how the lap steel became to signify the creation of the amplified guitar we must go back and look at what exactly brought about the perfect climate for the instrument to be brought forth to the general public's attention during the 1930s.

The roots of lap slide playing go back to a specific point in time. In 1885, Hawaiian musician Joseph Kekuku used a metal comb to slide up and down the strings of his guitar. Known as the father of steel guitar, Kekuku moved to the United States of America in 1905 and for the next three decades toured extensively, bringing the sounds of Hawaii to the attention of the American public. [1]Just as the recorded disc replaced the wax cylinder with improved recording technology, live performance also began to adapt and, following World War One, the expansion of recorded Hawaiian and jazz music quickly changed influence from regional to international. With the opening of new music venues during the 1920s, significant problems were found for the guitar. Whilst brass and percussion instruments easily projected, the traditional acoustic guitar could not[2] and although the brash projection of the banjo was effective to a point, its relevance started to fade. As musical styles quickly changed with the international distribution of American jazz and swing records, the banjo was eventually superseded by the acoustic archtop guitar, which was being developed by companies such as Gibson and Epiphone. Even so, the guitar's role was still one of accompaniment and was predominantly part of the rhythm section, rarely featuring as the soloist.

Guitarists such as Eddie Lang, Lonnie Johnson and Carl Kress who were virtuoso performers, recorded an extensive catalogue as solo or duet performers but still were thwarted by the sheer lack of volume needed for large multi-instrument ensemble playing. The search for volume intensified and during the mid-1920s, George Beauchamp's involvement with the National guitar company developed guitars with a rather ingenious method of increasing sound production, which operated on an entirely acoustic basis.[3] Electrical experiments with crystal pickups and corresponding amplifiers that worked in a similar fashion to the crystal radio set were trialled by the Gibson guitar company's research and development employee

[1] Mike Foley https://www.polynesia.com/blog/steel-guitar

[2] Mac Randall, *a century of the acoustic guitar,* Acoustic Guitar magazine, April 2018

[3] http://chasingguitars.com/nationaldobro-history/

Lloyd Loar in 1924, but the results were far from satisfactory. Likewise, the Stromberg guitar company experimented with other pickup methods, but these were also unsuccessful. [4] It was with the arrival of George Beauchamp and the Rickenbacker guitar corporation that we can finally point to the beginning of a working pickup for the 'electric' guitar utilising the electromagnetic system. By incorporating several thousand wraps of extremely thin copper wire surrounding a magnet, it was found that string vibration could be then successfully picked up by the magnetic field and then amplified. This small but remarkable discovery by a relatively small American guitar manufacturer proved to be the catalyst for the development for the electric guitar, as we now know it.[5] However, Beauchamp faced two problems; the new electromagnetic pickup was simply not suitable to be fitted to the contemporary archtop guitars due to uncontrollable feedback. The other issue was amplification. A suitably powerful, yet portable amplifier had to be manufactured to allow the guitar to be heard above a dance orchestra. As a result, the acoustic guitar still dominated without hindrance from technology and would continue to do so for the next 10 years. Meanwhile, Beauchamp's National Resophonic guitar company started to produce an extremely successful new range of metal-bodied 'resonator' guitars. They produced a particularly appealing sound, which proved to project successfully and were in step with changing tastes of the late 1920's and as such, country, blues and Hawaiian musicians quickly adopted them. National guitars were constructed almost entirely of steel or brass with an option for either one inbuilt aluminium speaker cone, or three separate cones depending on budget. The instruments were found to be ideal for being played with either a bottleneck slide or a solid brass slide bar held by the left hand that glided up and down the strings with ease, instead of the more typical downward pressure fretting technique.

Bar and bottleneck slide playing had been around since the invention of the steel strung acoustic guitar, but the combination of this unorthodox left-hand technique coupled with the acoustic projection of the National guitar proved to be instantly successful and the two companies became the favoured instrument brand for any aspiring slide guitarist. Hawaiian players after purchasing one of these newly available instruments would even fit a taller nut to raise the string height away from the frets. Los Angeles manufacturer Herman

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[4] Wallace Marx Jr, *the pickup story part 1; the 1920's* premier guitar magazine September 18, 2009

[5] Smith, Richard R. (1987), *The History Of Rickenbacker Guitars*, Fullerton, California, USA: Centerstream Publishing, pp. 9–10, ISBN 0-931759-15-3

Weissenborn had already created a completely hollow acoustic slide-specific instrument with the neck acting as a sound chamber in 1925 and although less than five thousand instruments were manufactured in total[6], they proved to be a catalyst for National's production of new slide-specific instruments. Beauchamp's love of Hawaiian music was evident with the new instruments, as National Resophonic began to manufacture specially designed 'fretless' instruments which featured the Weissenborn idea of factory fitting an extra high nut, just to raise the strings about two centimetres from the fingerboard. This adjustment allowed unhindered slide bar access and a crucial volume increase. The new instruments were commonly known as square necks due to the Weissenborn-influenced large hollow square profiled neck up to the headstock, which acted as additional sound chamber space. To compliment the unusual appearance of the instruments and perhaps to even highlight the Hawaiian connection, the range usually featured art deco engraved images of palm trees; birds or contemporary patterns on the metal body and were finished with bright shiny nickel plating. The square necks became an instant hit and helped generate considerable international interest in the new-recorded sounds of Hawaiian and the rising market of Bluegrass Country music.

It was the Hawaiian music boom of the early 1930's that undoubtedly proved to be the turning point for amplified instruments, due to the rise in audience numbers[7]. Such was the popularity of the music that every dance orchestra began to feature Hawaiian songs as part of their repertoire with the rhythm guitar player now being expected to diversify into the world of lap slide playing. However, whilst a strategically placed microphone could amplify a square neck over a primitive public address system in one of the more affluent ballrooms, the problems associated with the guitar competing with the ensemble volume persisted for most players. By 1931 Beauchamp had a successful application for the electromagnetic pickup. He had realised that the feedback problem of acoustic guitars was due to the guitar's top vibrating and interacting with amplified sound waves. Preceding Les Paul's experiments with solid body guitars by some fifteen years, he decided to mount the pickup to a solid but lightweight aluminium guitar that was to be played flat across the knee and was light heartedly known as 'the frying pan' due to its unconventional shape.[8]

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[6] Ben Elder *unravelling the mystery of the Weissenborn guitar,* Acoustic magazine April 1996.
[7] *The Hawaiian Invasion*, David Lerer, The Appendix, December 18, 2014
[8] https://www.metmuseum.org/art/collection/search/729575

The Rickenbacker Electro Guitar Company officially launched the new Electro A-22 steel guitar in 1932 and was met with a somewhat underwhelming response. The first publicised performance of the instrument was that same year, by Wichita musician Gage Brewer[9], who used one of Beauchamp's prototype guitars - an A-25 constructed with a slightly longer neck. However, it was not until 1935 before the instrument would feature on a recording, namely by Western Swing musician Bob Dunn [10]who was the steel guitarist for Milton Brown, a Western Swing band leader based in Houston, Texas. Despite a slow start, the lap steel's popularity soon gathered momentum and national interest and as Josh Jones says, the Rickenbacker lap steel began 'being integrated into live jazz bands'.[11] Due to the delayed patent laws, other manufacturers were quick to adopt the design and started to manufacture their own instruments. In 1935, the Gibson guitar company developed the E150 steel guitar[12], utilising a new design of electromagnetic pickup. A magnetic blade surrounded by copper wire which neatly fitted under the strings – such was the success of this steel guitar; Gibson then went one step further and successfully fitted it to an archtop acoustic guitar and named it the ES-150. By the summer of 1936, both instruments were to be found in shops complete with matching portable amplifier that produced an unprecedented fifteen watts of sound. Gibson quickly brought in successful performers to publicise the electric steels such as the virtuoso Roy Smeck who was given a signature model in 1936. Although the electromagnetic pickup had been developed for the steel guitar, its adoption by the archtop acoustic guitar proved to be the start of a new revolution in amplified sound. The electric guitar had been born and now that the electromagnetic pickup had been successfully produced, the path was now open for successive manufacturers to adjust, refine and develop. As the Hawaiian craze was slowly fading, the rise of country music was ascending and by the early 1940's, the Rickenbacker Company had begun to manufacture lap steel guitars with two parallel necks

[9] http://www.simonboxes.com/history-of-lap-steel.html

[10] http://www.simonboxes.com/history-of-lap-steel.html

[11] Josh Jones http://www.openculture.com/2016/04/behold-the-first-electric-guitar-the-1931-frying-pan.html

[12] http://www.gibson-prewar.com/gibson-1935-e150/

[13]to accommodate different tunings. Such was their weight that they were mounted on legs, allowing the player to either sit comfortably, or even to stand.

The Second World War halted instrument development, as all factories were compelled to engage in war-effort manufacturing, but by 1946, a new revolution was about to be born led by Los Angeles businessman, electronics expert and opportunist Leo Fender. Fender was a country music fan who could not play an instrument[14], however he had a keen eye for a new venture and self-promotion. The development of amplification had not satisfactorily progressed over the previous 10 years and as concert halls grew in the new post war environment, more volume was needed. Fender spotted a gap in the market and crucially listened to musicians' needs, producing a new amplifier and steel guitar, which was gradually adopted by a whole genre. By the 1950's, the clear biting treble of Fender's variant of the electromagnetic pickup, coupled with a powerful 25-watt amplifier enabled the new Western Swing bands to fill most dance halls with sound. As the popularity of Hawaiian music faded and the steel guitar's popularity remained perhaps only as a niche side-line to a guitarist's repertoire, the instrument was to see a huge growth. Fender steel guitar and amplifier sets became to define the sound of a new bold and progressive country music and by 1949 were 'fully entrenched in country industry'[15]. The new stars of the genre, such as Red Foley, Hank Snow and Bob Wills prominently featured Fender steel guitars in concert and on record. With every opportunity, the new Fender Instrument Co of Fullerton, California utilised this publicity with magazine adverts and trade fair stalls and according to historian Richard Smith, recruiting a 'group of guys who were western swing musicians'[16] to try the new instruments and amplifiers free of charge with the condition of having to report back with advisory comments for improvements. Fender further developed the steel into 'console' models utilising increasingly large 2, 3 and 4 neck variants complete with adjustable legs. However, Fender's interest lay with new possibilities and just as Gibson developed the

[13] Richard Smith *the history of Rickenbacker guitars* p40

[14] https://guitar.com/features/interviews/leo-fender-the-guitar-genius-who-couldnt-play-a-note/

[15] http://www.fundinguniverse.com/company-histories/fender-musical-instruments-company-history/

[16] https://bassmagazine.com/lessons/partners-leo-fender-the-group-of-guys

EH150 into an electric guitar, Fender's Professional series of steels gave birth to the solid body Telecaster and Stratocaster guitars.

The 1950s proved to be the twilight years for the lap steel's popularity[17]. The multi neck console models built by Fender, Gibson and Paul Bigsby were being superseded by variants fitted with pedals to enable individual string pitch modulation, quickly marketed as 'pedal steel' guitars. Indeed, such was the spread of development, by the late 1950's most manufacturers had stopped making the double neck console models, reducing production to single neck lap steels aimed at the amateur. In truth, this had been coming for a while. Within the country music genre, lap steel players found their ability to shift from chord to chord was limited, and changing from major to minor, or from the I to the IV or V required jumping the bar across the neck. Players devised techniques to work around this, such as angling the bar, using extra strings for extended tunings, and even bending strings behind the bar with the remaining available left-hand fingers. Given these limitations, players such as Leon McAuliffe, Jerry Byrd, Joaquin Murphy, and Herb Remington worked musical miracles, but a more sophisticated solution was needed. To meet this need, as far back as 1939 the steel guitarist, big band leader, television personality Alvino Rey was already experimenting with steel guitar and voice box effects as shown here in 1944 https://youtu.be/rxLCYK1KohY. He subsequently collaborated with a machinist to design an electric steel guitar with pedals. In 1940, the Gibson Guitar Corporation introduced the Electra harp. The initial instrument had a group of pedals fanning out from its left rear leg, like those on a harp. The pedals and mechanical system made it possible to alter various string pitches with or without moving the bar, to smoothly transition from chord to chord. The most important development, however, came in the late 1940s. Mounted across a rack between the front legs of the instrument, the pedal system we know today was the brainchild of Paul Bigsby[18]. Bigsby was soon building these more complex instruments for such top players as Speedy West, Noel Boggs, and Bud Isaacs. In 1948 West asked Bigsby to build a three-neck, four-pedal model. His first recording with it was Eddie Kirk's *Candy Kisses* in 1949. West later worked with Ernie Ford and Loretta Lynn but is best known for the

[17] https://reverb.com/news/fenders-don-randall-offers-revisionist-take-on-leo-cbs-and-the-compnays-early-days-bacons-archive

[18] *Ross, Michael (November 17, 2011). "Forgotten Heroes: Paul Bigsby". Premier Guitar Magazine.*

energetic instrumentals he recorded solo and with virtuoso guitarist Jimmy Bryant. In 1952, Zane Beck, a steel player and builder who had backed Hank Williams, Jim Reeves, and Webb Pierce began adding knee levers to console steel guitars. Unlike standard pedals, Beck's knee levers lowered string pitch rather than raising it. [19]

And so, as the decade closed, so did the influence of the lap steel, its swansong perhaps being the 1959 hit 'sleepwalk' by Santo and Johnny who used a 3-neck Fender console model. Certainly, by the mid 1960's, the lap steel was all but gone from popular recordings, completely superseded by the pedal steel. Manufacturing companies such as Fender, Gibson and National simply stopped production and removed any reference of the instrument from catalogues. Only performers such as multi-instrumentalist David Lindley continued to use the instrument, but for most genres, it was dead. However, in the Churches of the Southern American states, interest was growing forming with what was to become known as 'sacred steel'. The actual use of slide instruments in African American churches goes back to the 1930s, with Minister Willie Eason replacing the Church organ with steel guitar, but subsequent performers such as Eason's nephew, Aubrey Ghent became pivotal for the instruments appeal across whole regions of the country, with recordings and performances attracting considerable attention amongst Church musicians. Steels during the 1950s were cheap instruments, readily available to purchase in pawnshops following the boom and decline of the instrument in country and Hawaiian music. Since Ghent's promotion of the lap steel, sacred steel has seen major interest over the last fifteen to twenty years and the lap steel has seen positive use in the hands of many contemporary acts, such as Robert Randolph, the Campbell brothers and the Lee Brothers who have moved to popularise the genre for an international audience. [20]

Seemingly to run concurrently with the popularity of sacred steel was the rise of the Americana, Alt-Country movement, initially across America and then Europe. As an act of sheer rebellion against the glossy and brash 'pop-country' output from 1980's Nashville, initially led by artists such as Dwight Yoakam and Hank Williams III, musicians began to reach back to earlier forms of country music[21] and with this came interest in older

[19] https://www.fourstjames.com/blogs/stories/the-steel-guitar-the-instrument-behind-country-s-signature-sound

[20] https://www.georgiasteelguitar.com/history-of-the-sacred-steel-guitar-tradition

[21] K. Wolff and O. Duane, eds, *Country Music: The Rough Guide* (London: Rough Guides, 2000)

instruments such as the lap steel. Amongst Bluegrass musicians, Alison Krauss's Dobro virtuoso Jerry Douglas has now adopted the lap steel as part of his instrument choice and has been a key founder of the Trans-Atlantic sessions bringing American Country roots music back to its Celtic origins. Million selling bands and artists such as K D Lang, Wilco and Calexico found themselves under the spotlight with the steel guitar providing an emotive and evocative sound for a new generation and this interest in Americana undoubtedly spilled across into other genres, such as Jazz. Internationally acclaimed contemporary Jazz guitarist Bill Frisell and saxophonist Charles Lloyd have both turned their attention to the soulful sounds of the steel[22]. Following a self-acclaimed epiphany, Frisell changed his musical direction and by hiring master slide musician Greg Leisz, created a new atmospheric and bold sound for improvised music. This in turn has created a sub-genre of jazz that brings a more cinematic approach to the music and has brought musicians such as Christine Bougie to attention.

Most recently a surprising move has been made by some of the large instrument manufacturers. Following the rising interest of Americana and Sacred Steel, Fender, Gretsch and even custom builders such as Bill Asher [23] have reintroduced lap steel instruments on a relatively small scale with innovative developments such as palm pedals which control string pitch, giving a similar effect to that of the pedal steel[24]. Eighty-eight years have passed since Joseph Kekuku's death, yet the future indeed looks bright for the lap steel.

[22] Geoffrey Himes https://jazztimes.com/features/profiles/pedal-steel-guitar-slides-into-jazz/

[23] https://asher-guitars-lap-steels-store.myshopify.com/collections/all-lap-steels

[24] http://www.rees-electric-guitars.com/PalmSteel8.html

Chapter 2

Contemporary lap steel players

The recent interest in the lap steel guitar has largely been as a result of players producing important recordings that have subsequently gone on to reach a wider audience through the internet. Without doubt, the instrument's appeal has been enhanced by having an online presence and as such, musicians who have not had the luxury of a large record deal have benefitted from internet search and word of mouth, via social media linking to video clips and self-promoted websites. However, I do feel that the current interest has largely been energised by a handful of recording artists who have used the instrument in settings of both wide mass-market appeal and perhaps more niche areas within the Jazz genre that have proved to be catalysts for further exploration. Also of particular note is the piece that has cast a long shadow over the direction of the lap steel in the post 1950's period. In 1959, the instrumental *Sleepwalk* became an international hit record. Recorded by brothers Santo and Johnny Farina, its legacy has influenced so many recordings, film scores and subsequently so many steel players. No other popular hit record has ever featured lap steel playing the entire melody, which featured beautiful slid harmonics combined with highly emotive phrasing. Its impact on slide musicians who perhaps were not steeped in gospel, country or Hawaiian music cannot be underestimated: in 1959, *Sleepwalk* truly was a progressive lap steel composition and performance. https://youtu.be/YBRCvVpknvg

Figure 2

David Lindley

https://www.davidlindley.com/

Figure 3

To consider musicians who have taken the lap steel further from the original source, David Lindley must be a prime contender. As a prolific multi-instrumentalist, Lindley has performed since the 1970's on the instrument and has been featured on a number of recordings with several internationally known artists. Lindley was performing on the instrument when it had truly fallen from fashion and has grown interest and influence for the instrument over 5 decades. In 2010, music journalist Dan Forte said that, "Lindley did for lap steel what Los Lobos did for accordion; he made it a rock instrument (look around and note the propensity of such previously obscure makes and models as Weissenborns and Rickenbacker Bakelite lap steels)"[25]

Lindley initially became known through the music of U.S artist Jackson Browne with whom he has had a fifty-year association. With Browne, Lindley's playing brought in elements of country, folk and blues, often played with an overdriven tone such as here on the song *Before the Deluge* in 2010.

[25] https://www.vintageguitar.com/5233/jackson-browne-david-lindley/

https://youtu.be/h8y45mAGJRA

His style is highly melodic and quite unlike anything recorded on lap steel before the 1970's. His approach is like bottleneck slide guitarist Duane Allman who revolutionised that technique along with Ry Cooder in the late 1960's and 1970's. Here's Lindley again demonstrating melodic pop sensibility with his solo on Jackson Browne's 1980 hit *Hold On, Hold Out* (solo at 1:58)

https://youtu.be/pyBwvXBcznc

Through his recognition with Browne, Lindley launched his solo career in 1981 with the album *El Rayo X* (asylum), followed closely by *Win This Record* in 1982. As he is a multi-instrumentalist, the lap steel is not always brought to the fore, but here, Lindley shows his energetic side with a country rock song. His use of sacred steel note regeneration and hammer-on techniques gave new life to an instrument that was largely out of the public eye.

Mercury Blues

https://youtu.be/TAbbgSKUZB4

Ben Harper

https://www.benharper.com/

Figure 4

The popular face of the lap steel guitar has not been better represented than from the works of Ben Harper. Harper, a disciple of Lindley, likes to switch between guitar, Weissenborn acoustic slide guitar and electric lap steel and regularly plays sell out shows internationally. His rise since the mid 1990's has seen 3 Grammy wins and 7 nominations and the final issue of the hugely successful U.S published magazine *Guitar Player*, chose Harper as their cover

feature in December 1999, holding his custom-built Asher lap steel for the very last issue of the 20th century.

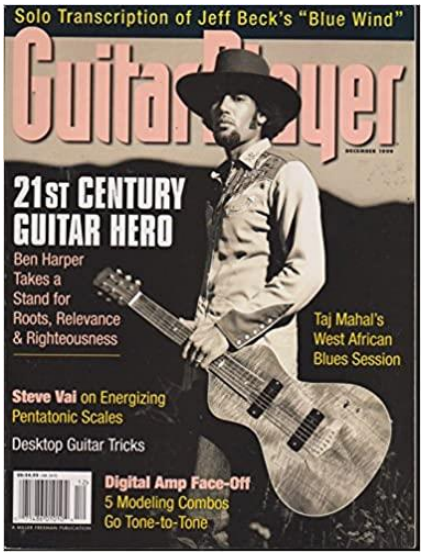


figure 5

As Harper mentions at 29:09 in this interview; https://youtu.be/yS6Q_uN_C1s, his lap steel influence comes directly from David Lindley and Ry Cooder after hearing them in person at his grandparent's music shop, however Harper's individuality on the instrument has branched to include his Bob Marley, Led Zeppelin and Jimi Hendrix influences creating a signature sound that is easily identifiable. Often featuring an overdriven tone, his lead lines have a distinct blues/soul vocal phrasing interspersed with chord fills. Here, Harper demonstrates his solo approach with the as-yet unreleased song 'giving up your ghost' https://youtu.be/hZSYaPokSQk although in concert settings, Harper's solo material is often played on his acoustic Weissenborn with the lap steel held back for the louder songs performed with the whole band, such as *Why You Must Always Dress in Black* (solo 5:30) https://youtu.be/9PXke7vF2Uc

Harper's popularity has not diminished over the last 20 years and he continues to perform with his custom-built Asher lap steel globally.

Greg Leisz

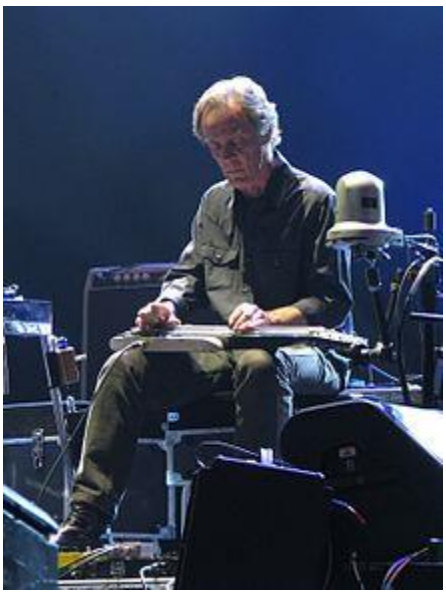


Figure 6

Leisz has been a session musician for many acts including K D Lang, Eric Clapton, John Mayer and Bruce Springsteen, with whom he mostly played pedal steel. Leisz's talents however run beyond pedal steel; he also plays the acoustic Weissenborn and dobro slide instruments alongside lap steel and conventional guitar. In 1998, leading jazz guitarist Bill Frisell recruited Leisz for an album called *Good Dog, Happy Man* (nonsuch records) where Leisz was given free rein to create an almost cinematic soundscape with all his slide instruments, underpinning Frisell's improvisation. Without ever really taking the lead, Leisz still manages to create a definite mood for the record, such as on this track *Roscoe.*
https://youtu.be/PE_t5iZHFXg

Leisz was keen to utilise the lap steel through effects and overdriven amplifiers and with Frisell, he was given a freedom that arguably was not apparent during his popular music studio sessions. *Good Dog, Happy Man* features pedal steel, dobro, Weissenborn and lap steel, but it was for the subsequent following album that Leisz focussed his attention on the lap steel, played through an overdriven amp with tremolo and wah effect; *Blues Dream* (2001 Nonsuch records) where Leisz's overdriven lap steel created dark and meandering passages that intertwined with the long-drawn-out melody sections, such as the track *Ron Carter*.
https://youtu.be/AVWwX7rBS8k

Frisell's compositions from this period have definite parallels to Ry Cooder's lonesome, drawn out soundtrack to the 1984 film *Paris Texas* and it is with the long-sustained slide

notes of Leisz's lap steel the connection is instantly made. Cooder in fact makes an appearance on the *Good Dog, Happy Man* album track *Shenandoah*. Such was Leisz's input on the Frisell records that a track was named after him;
https://www.youtube.com/watch?v=maFv2BxC9M0.
Following *Blues Dream*, Leisz was again recruited for a third consecutive album, *The Intercontinentals* in 2003 where he mostly played pedal steel. Although Leisz has rarely released solo material, a special album released in 2003, featured his post Frisell influence on an original track called *Santo's Dream* from the album *Legends of the Incredible Lap Steel Guitar* as homage to Santo Farina who played on the 1959 lap steel instrumental *Sleepwalk.*
https://youtu.be/NaXC8UuiU4E
Leisz has always been a busy sideman and after the Frisell albums he returned to backing pop, country and rock artists on pedal steel. However, Frisell returned later that decade with Leisz, here in 2009 playing a Thelonious Monk composition *Misterioso*.
https://youtu.be/4k-oPe13gzM
and reunited on record in 2009 with the album *Disfarmer* (Nonsuch) which was written for a series of photographs taken by Mike Disfarmer and *All We Are Saying* a retrospective of the music of John Lennon where he played pedal steel and Weissenborn. However, that same year found him playing blistering blues lap steel on an early Rickenbacker frying pan model, still with his signature overdriven tone and impeccable note choice on tour with Eric Clapton.
https://youtu.be/65C5HkNJVmQ

Most recently, Leisz has been involved in a new project with his wife and bassist Mai Leisz, guitarist Michael Landau, drummer Gary Novak and released a single *Skies Above Salkantay* in March 2020 where he is featured on lap steel.
https://youtu.be/PokHg3NK_aQ

Leisz had hit on a new direction for the lap steel and pedal steel guitar and with Frisell it can be argued that with this approach, a whole new sub-genre of Jazz had been created, referencing old country music, old popular rock recordings, cinematic soundtrack married with contemporary harmony that has been embraced by Jazz musicians such as pianist Brad Mehldau, guitarist Jakob Bro and Julian Lage.

Roosevelt Collier

https://www.rooseveltcollier.com/home

figure 7

Collier comes straight from a Sacred Steel background, following the path led by pedal steel virtuoso Robert Randolph. However, unlike Randolph, Collier is equally adept on both pedal steel and lap steel. Collier, like Randolph, has branched out away from the church and with a steadily growing solo career, has seen him tour the world. Recently, he featured as part of the acclaimed Dutch Metropole Orkest who performed at the Royal Albert Hall. Here is Collier featured on a composition called *Maison En Feu* with vocalist Bokante.

https://youtu.be/iAx-9BiAVvI

And, here, playing a rousing 'vocal' finale on the piece *Fanm* with Bokante and the Metropole Orkest.

https://youtu.be/329B4a101No

As you can hear both with the finale of *Fanm* and his opening cadenza on *Maison En Feu*, his lead lines are very much phrased in the same manner as a gospel church vocal. However, Collier's improvisation frequently goes on to include heavily overdriven phrases peppered with wah effects. His playing, true to the sacred steel foundation is highly energetic and

emotive, but he can equally sit incredibly comfortably in a duo setting, here with Andy Thorne playing *Fiddlin' Around.*
https://youtu.be/fstvN4KX12k

Jerry Douglas

https://jerrydouglas.com

figure 8

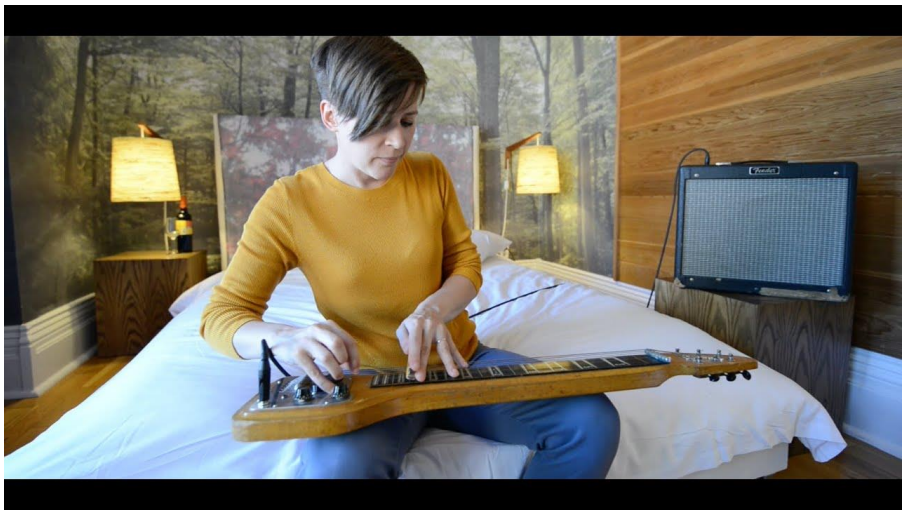
Although not known primarily as a lap steel player, Jerry Douglas is perhaps the most in-demand bluegrass slide Dobro player in the world. His blistering, lightning quick phrases have been a part of the Alison Krauss Union Station band for over two decades, however Douglas' forays with the lap steel has brought the instrument into areas previously unexplored. His impeccable right hand-picking technique has transferred well to the instrument as shown here in concert playing the old Leadbelly song *On a Monday*.
https://youtu.be/AVcYpdnKiS4
Douglas' harmonic knowledge has also allowed him to branch away from strict bluegrass and embrace more rock influences such as *Here We Are* from his 2012 solo album *Traveler* featuring grittier overdriven tones with virtuosic phrasing.
https://youtu.be/PIzFqdS5MXA

Such is Douglas standing amongst musicians, that his move to lap steel for some sessions and solo tracks has caused some considerable interest. Lap king has developed his main custom-built instrument instruments and features twin pickups, strap buttons to enable a standing position whilst playing and a device for instantly changing tunings with the flick of a lever. He plays the lap king through various effects including overdrive, delay and envelope filter auto-wah as demonstrated in the first 15 minutes of this recent interview from 2019.
https://youtu.be/exfCjd8O3RM
Douglas has also featured the lap king steel alongside the acoustic dobro on his transatlantic sessions project which aimed to bring together Celtic musicians from Ireland and Scotland with American bluegrass.
https://youtu.be/q2jA2eDUlVI
As someone who once only ever played acoustic slide dobro, his move to encompass lap steel has given the instrument an elevated standing.

Christine Bougie

http://www.christinebougie.com

figure 9



Canadian musician Christine Bougie is amongst the new generation of younger lap steel musicians who have chosen to utilise the instrument away from its traditional role and has sought to break new ground. Her latest self-released album *Whistle Up a World* has been recorded using sounds only produced on the lap steel itself, shown here with the opening track *Do I Ramble?*

https://youtu.be/sDwih-dvK8s

Bougie has released 4 albums to date.

Hammy's Secret Life (2007)

*Aloha Supreme (*2010)

Hearts and Galaxies (2012)

Whistle Up a World (2016)

Her influences have strong Bill Frisell references, and she has written ensemble compositions that feature the steel as lead instrument such as *Think from the End* from her debut album *Hammy's Secret Life.*

https://youtu.be/bzYTK_qWmj4

Bougie's approach is strongly melody based, originating from her early years practicing along with vocalists on recordings. She favours a mostly clean tone when playing in an ensemble setting, shown here with *Me Her* from *Aloha Supreme* album.

https://youtu.be/EXE2P6hAJhU

Bougie frequently uses simple but emotive effects with her steel, mainly delay and reverb, keeping the general tone of her Gibson Skylark lap steel true to its source. As a busy session musician, she alternates between guitar and steel with a growing discography to show her flexibility.

Chapter 3
Techniques

Several techniques are used throughout the six recordings, showing stylistic and tonal differences applicable to the instrument. Lap steel players have traditionally used a thumb pick and two metal fingerpicks, however for this project I have preferred to use bare fingers as the audible change is better suited to my choice of musical direction. Whilst metal fingerpicks produce a clear and precise sound, I have found that bare fingers produce a warmer tone which can be manipulated easily to produce a wider dynamic range like the fingerstyle approach on conventional guitar.
The following demonstrations show vibrato change, dynamic range, and variations of instrument tone, pedal effects and the creation of harmonics; how they can be manipulated.

1) Equipment overview

https://youtu.be/WZiz9iKnOyE

The first video is a simple look at the equipment I use. My main lap steel is 1949 Gibson BR9 lap steel which were produced between 1947 and 1959. It features a single P90 pickup which was also used on all Gibson electric guitars between 1947 and 1957. I also have a 1954 Fender Champion lap steel which is used some of the recordings and gives a much brighter tone due to the pickup construction; this pickup is identical to the bridge unit found in Fender's first revolutionary solid body electric guitar, the Telecaster.

The lap steel's signal is fed through a series of effects pedals, not all used at the same time. There is a wah-wah, tuner, auto wah, overdrive, reverb/tremolo, echoplex and delay; I also sometimes use a volume pedal at the start of the pedal chain. The amplifier is a forty-five-watt Victoria Victorilux valve amplifier with a fifteen-inch speaker. I also have two other valve amplifiers which are feature on the recordings, which are hand-built replicas of Fender products from the late fifties. The first is a forty-five-watt Fender Bassman amplifier with four ten-inch speakers that produces a brighter punchier sound and an eighty-watt Fender Twin amplifier with two twelve-inch speakers that produces more volume. Each amplifier has its own tonal quality and all work incredibly well with both standard electric guitar and lap steel.

For the demonstrations, I have also used two specialist-recording devices. Made by Universal Audio, they are currently one of the market's best guitar recording accessories available. The signal from the amplifier goes to a piece of equipment called *The Ox* that is connected between amplifier stage and speaker. It is essentially an attenuator that allows a valve amplifier to run at full power, whilst the sound coming from the speaker can be adjusted to be incredibly quiet, yet still retain the characteristics of a valve amplifier being operated to the point where the valves start to create a natural distortion that colours the tone in an appealing manner. *The Ox* is then fed into a Universal Audio interface called the *Apollo Twin*, which is then fed to an Apple iMac. Both the *Ox* and *Apollo Twin* have software that interact with recording. *The Ox* software replicates different speaker configurations from a small single ten-inch speaker cabinet to a large Marshall four-speaker cabinet. Each of these has different microphone simulations ranging from ribbon microphones to the Neumann U87 condenser microphone; Different size live room simulations are also available. The *Apollo Twin* interface also has software from plate reverb, Roland space echo simulation, and various microphone preamps to guitar and bass amplifier simulation. I have opted to use *the Ox* simulation of a two twelve-inch speaker cabinet with any effects coming from my pedals.

Traditional steel guitar playing usually featured a mix of chord punctuation and single note runs. A clean tone was often favoured with vibrato kept to a minimum as shown here where I have opted to use a G6 tuning, stylistically compatible with early country music.
https://youtu.be/uFOfRAppAFQ
As the instrument has developed and been adopted to other styles, here are some of the featured techniques.

2) Sacred Steel Vibrato

https://youtu.be/oQcN2FXyeeI
The very nature of sacred steel shows off the natural exuberant and emotive side to music. Harmonically it is based on simple pentatonic phrases, however delivery and the intent of delivery are of prime importance. Vibrato is a key component of the lap steel's role within the music, intending to replicate the soulful gospel vocals that are characteristic of the genre. The left hand holding the bar is moved in quite an aggressive manner giving a wide and intense vibrato. This also acts as a note regeneration technique as the friction between bar and string creates a continual vibration causing the note to continue. A whole step glissando up or down to the target note is commonly used, creating even more drama and emotion. The right-

hand picking is forceful, with the thumb, index and middle fingers sometimes reaching to the underside of the string to pull even harder on the note. Featured by players such as Robert Randolph and Roosevelt Collier, the sacred steel approach to playing has now started to become internationally popular, influencing other genres such as rock and jazz.

3) Greg Leisz influenced vibrato

https://youtu.be/nnr5RZbHEYo

An incredibly important figure for contemporary steel guitar, Greg Leisz's influence has transcended genre. From his initial country music roots, Leisz has recorded for rock bands, blues artists and leading jazz exponents such as Bill Frisell and Charles Lloyd. Leisz's lap steel playing is quite recognisable, with long drawn-out phrases, sustained overdriven notes and a subtle vibrato which occasionally breaks into sacred steel territory, however Leisz's left hand vibrato uses the bar with a shorter amount of travel across the string than Randolph or Collier giving the note sustain due to the friction/string regeneration but without the wildly emotive sound. As a result, note choice is clearer and the ability to blend as part of a supporting ensemble is made easier. Although Leisz uses finger and thumb picks, his right hand is seldom aggressive and again is a good measure of his overall control and restraint. On some of the recordings such as *Mata Hari Part 1* written with Leisz and Frisell in mind and even the Hammond trio recording *Weasil*, there are moments where I have chosen to take the controlled vibrato and gradually changed into a more sacred steel approach, as demonstrated here.

3i) Vibrato change, Leisz to Sacred Steel

https://youtu.be/q_C11q4Ze-s

With both *Mata Hari Part 1* and *Weasil* this acts as a good note regeneration technique for the long, drawn out notes, but also creates an atmosphere of suspense against a relatively calm underpinning from the Guitar.

4) Harmonic on a single string

https://youtu.be/fJD1tQgoO1Y

A technique that was originated with the Hawaiian style of playing is the plucked harmonic on a single string. To achieve this, the player touches the string with their right-hand index finger, exactly one octave up from the bar position and whilst the right-hand index finger still in contact with the string, the thumb plucks directly behind it. As soon as the thumb plucks the string, the index finger must immediately raise upwards, releasing the harmonic. If the

right-hand index finger remains in position, string vibration is restricted, and nothing will happen.

4i) Harmonic with reverb

Plucked harmonic, slid with added reverb effect.

https://youtu.be/megd7mg0K5c

Once achieved, this harmonic can be slid to any position, producing an atmospheric and interesting sound. With the combination of reverb, the effect is even more dramatic, as featured on the original version of *Sleepwalk* by Santo and Johnny and the beginning of the following demonstration, I play the opening phrase from that recording.

4ii) Multi-string harmonics

https://youtu.be/JG9yRoqH2vs

I found that this same technique could be adapted to a multi-string approach. The exact same principle applies where the index finger is positioned an octave up from the bar. However, the thumb and finger are dragged across all six strings in one motion, with the right hand locked into position. The index finger moves rapidly across each string with the thumb automatically plucking. As soon as the finger and thumb are released to the next string, the note is heard. Any combination of two to six notes can be achieved. Once played, these chord harmonics can be moved around, just like the single string harmonic.

5) Note regeneration

https://youtu.be/6gucejAkPN8

A particular problem with plucked string instruments is note decay. With the electric guitar, it was found that solid body instruments could naturally sustain longer than their acoustic counterparts. Steel guitars, being the first true solid body instruments were developed with this in mind; combined with a high action (distance between string and fingerboard), sustain is increased again. However, unlike wind instruments, natural note decay still occurs, and it was discovered that left-hand bar vibrato could keep a note at a constant volume indefinitely. The demonstration shows a note being sustained for quite a while and then moved to a different pitch on the same string without a break. The note dynamic can be increased by

pressing the left-hand bar more firmly downward into the string whilst the bar vibrato is still moving.

5i) Alternate methods for note regeneration.

https://youtu.be/Es_CjQ_IoBk

This technique was inspired by seeing David Gilmour, guitarist with the psychedelic rock band Pink Floyd use a slide bar on his Fender Stratocaster guitar during a performance of *A Saucerful of Secrets* from *the Live at Pompeii* film made in 1971. (5:36 https://youtu.be/hSsjxbRxgqY) Gilmour holds the bar with his right hand and rubs it against the first string on his guitar creating a strange continuous pitch. Depending on where the bar is rubbed, the pitch is changed, creating melody with the technique transferring quite easily to lap steel as shown with *Mata Hari Part 1*. When applied to the lap steel, I found that my left hand suited the technique a little better and my right hand was able to mute the other strings. This technique is only applicable to the two outside strings of both guitar and steel, as the bar moves perpendicular to the string. The bar must be also angled upwards, to not interfere with the other five strings on the instrument.

6) Dynamics and the overdrive effect

https://youtu.be/2jYPUQLzNyQ

Overdrive or 'distortion' has been a key effect in creating new pathways for the lap steel. Originating from valve amplifiers being operated at full power, the resultant inefficiency of the vacuum tube creates an interesting colouring of the instruments signal. Problems arise from this method, namely that the amplifier is either too loud, too fuzzy, in danger of speaker damage or that the tone cannot be further manipulated in a satisfactory way. Since the sixties, manufacturers have sought to replicate this sound through a pedal that could then be used at more manageable volumes and it is only over the last twenty-five years that successful designs have been available. My personal choice of pedal is the *Fulltone Fulldrive 2* https://www.fulltone.com/products/full-drive2-mosfet that I have been using for the past twenty years. With the *Fulldrive 2* pedal, the overdrive is incredibly responsive to picking dynamics. If I play the string gently with my right hand, the tone is clean and undistorted. As soon as the string is plucked harder, the resultant tone becomes overdriven replicating the behaviour of a quality valve amplifier operating at considerable volume. This works perfectly with the lap steel, notes are clear and defined; even chords have good note separation, unlike

certain valve amplifiers that just reduce polytonal playing to undecipherable mush when played at full power.

7) Left hand bar trills

https://youtu.be/T4Sj-qMbE-0

The embellishment of phrases on most instruments often includes a trill technique. Both lap steel and guitar use this method to create interest for phrases and like the vibrato-led note regeneration technique which can self-sustain a note indefinitely, the bar trill can also regenerate the string and be played for as long as the player wishes. It is a relatively simple technique that originated in the sacred steel genre. The bar is rapidly bounced up and down on a note with the open string alternately sounding with the held note when the bar is lifted. This technique can be used at any speed and can be moved up the string to incorporate other notes. It can also be applied to each string, although it is easier on the first string due to better accessibility.

8) Right hand trills

https://youtu.be/bW1Pgrtw24s

One issue with the left-hand bar trill is that an open string must be played as part of the phrase and with my tuning of GBDGBD, it perhaps would not be usable over certain chord progressions. An alternate method to embellish a phrase with a trill in different keys is to use the right-hand thumb and index finger, in a rapid alternate picking pattern. This can be applied to any combinations of two strings and can also be slid with the left-hand bar to a new position. Again, this originated with the sacred steel musicians who were replicating the sound of a harmonica trill, featured in American blues music as demonstrated here by Luke Clebsch https://youtu.be/WIAhX_Kfp2E.

9) Replicating guitar string bending techniques

https://youtu.be/BKW5iRQQf-E

Another technique for embellishing a phrase or even a single note is to basically copy the sound of a guitar string bend. Ironically, the guitar string bend was originally created to copy the bottleneck slide sound of blues guitarists who had been using that technique since the turn of the twentieth century. The basic principle is to play a fretted note and then push the string sideways until it changes pitch from microtones up to a minor third; beyond this, there is a strong possibility of string breakage. The treatment of a guitar string bend depends on the

setting; country music string bends are very precise with little vibrato, whereas blues and soul string bends are often embellished with vibrato and sustain. This can be readily applied to the lap steel with good effect.

10) Bar slants

https://youtu.be/7XYY41-C95w

A common technique and a development from replicating bottleneck slide and string bending is an old Dobro technique called the bar slant. Bar slants were adapted to fixed bridge slide instruments to enable a smooth transition between chord tones. On the traditional Dobro and lap steel using a standard tuning of GBDGBD, the left-hand bar can be manipulated to be held at an angle and play two notes that otherwise would be impossible with the bar held perpendicular to the strings. The first bar slant on the above demonstration shows a simple IV – I cadence in the key of C major at the fifth position. The bar is slanted to cover frets six and seven, playing notes F and A. These two notes are then slid back to fret five with the bar returned to the straight position and resolving with the notes E and G sounding. At 0:14, the transition from I – IV is made by playing the notes E on string three and C on string one with a slant. The bar is then straightened to raise the E up a semitone to an F, whilst the C on string one remains constant.

10i) Bar slants and pedal steel simulation

https://youtu.be/8JAoeeU9QA0

Typically played with a clean and undistorted sound, the addition of a volume pedal, the pedal steel guitar can be replicated by reducing volume on the note attack and then gradually increasing as the note rings and changes to, or from a slant. This also works on single note phrases, where the initial note attack is dropped and then quickly followed by the volume increase, creating atmospheric swoops and slides.

11) Effects

i) Wah-wah

https://youtu.be/v8loYPYAP7s

In recent years, musicians such as Greg Leisz, Kaki King and Roosevelt Collier have been introducing effects to the lap steel's repertoire. A common effect is the wah-wah pedal that was originated for steel guitar in the thirties. Manufacturers would often fit a tone control to

the instrument which when turned, had a quick change from a muffled tone to a piercing treble tone, as shown here by virtuoso musician Buddy Merrill on a Fender four-neck console steel guitar; (technique used at 1:00)
https://youtu.be/xcipRLzk4zM

This technique known as *boo-wah* quickly became incredibly popular for country and Hawaiian steel players with steel player Anthony Rocco developing the world's first 'tone expressor' pedal in 1937 [26]. From Rocco's invention, other companies such as DeArmond and Fender quickly developed their own version, reducing the need to operate the effect from the guitar itself. The original boo-wah pedals had a limited tonal range, but during the sixties, manufacturers such as Jim Dunlop and Vox introduced wah-wah pedals that had a wider tonal range, boosting both treble and mid frequencies to create a more intense effect. It was also found that whilst switched on, the wah-wah pedal could be held at any frequency to create a different tone compared to the normal signal from the instrument.

ii) Echoplex/Delay

https://youtu.be/fLYfzYnMaCM

Like the wah-wah, echo and delay effects have been developed over a considerable time period, particularly with tape echo developments by Les Paul in the late nineteen forties who created whole soundscapes from one instrument. Sam Phillips created tape echo *slap back* on his Sun studio recordings during the mid-fifties and as Christopher Ancrangelis says,
"Around the same time that Les Paul was exploring the technology, European composers exploring the possibilities of recorded music were exploring tape echo as well. Pierre Henry innovated an entire tape–based collage style of classical music called *Musique Concrète*, with Karl Heinz Stockhausen and the BBC Radiophonic Workshop soon following suit with their own tape–based music." [27]
Portable tape echo units became incredibly popular during the late fifties with Maestro introducing the legendary Echoplex tape echo unit in 1961. The principle of tape echo is that a note is recorded onto a continual loop of tape and then is played back whilst other notes are

[26] http://muleskinner.blogspot.com/2010/11/from-guitar-player-magazine_08.html

[27] https://reverb.com/news/repeat-that-a-brief-history-of-tape-echo

being recorded and then subsequently played back. However, the devices often needed the recording and playback heads cleaning and tape replacing. This method remained as standard until the seventies when companies such as Boss brought out analogue electronic pedals which recreated the effect quite accurately and reduced the need for time consuming maintenance. Digital electronic versions soon followed during the eighties featuring much greater delay time ranges. My echoplex replica pedal is made by the company Catalinbread and is modelled on the Binson Echorec which was a tape unit based on the Echoplex and favoured by musicians such as David Gilmour from Pink Floyd.

iii) Echoplex delay with volume pedal

https://youtu.be/pRStYGnRNyo

The echoplex effect can produce very atmospheric sounds on the lap steel, especially with a volume pedal, typical of musicians such as Canadian producer Daniel Lanois.

12) Changing tone with the right hand

https://youtu.be/bFNfRmgWC4Q

The right hand can also change a note's tone just by plucking the string in different areas. When picked near the bridge area the tone is harsher and as the hand is moved forward, the tone becomes more rounded. Continuing towards the left-hand bar, the sound becoming lighter and perhaps thinner. Of course, as shown on a previous video (number six, dynamics and overdrive), dynamics are simply altered by the right hand's force.

Chapter 4

Instruments used: 1951 Gibson BR-9 and 1954 Fender Champion lap steel guitars.

Gibson BR-9

figure 10

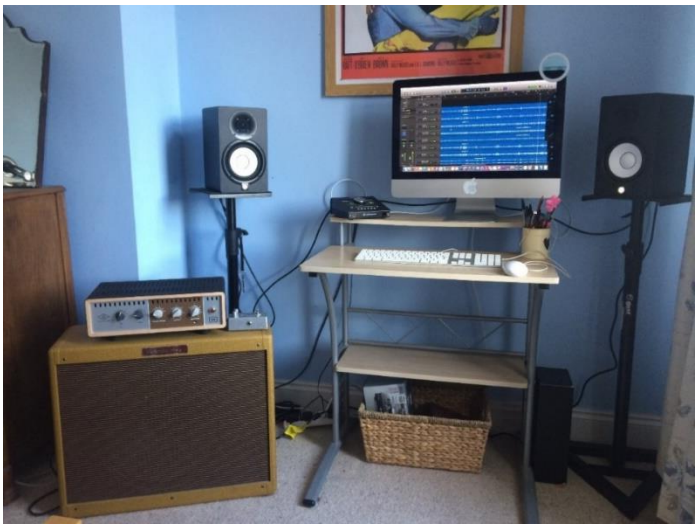
figure 11 Fender Champion

figure 12 Victoria Victorilux 45W amplifier, with fifteen-inch speaker.

figure 13 Rear view showing the valve circuitry.

figure 14 Fender Champion with pedal board. Input sequence, right to left; Vox wah-wah, Boss TU-2 tuner, Z Vex seek-wah, Fulltone Fulldrive 2, Strymon Flint reverb/tremolo, Catalinbread Echorec, Strymon El-Capistan delay.

Figure 15 United Audio OX on top of the Victoria Victorilux amplifier, feeds to United Audio Apollo Twin interface, into iMac Logic X



Chapter 5

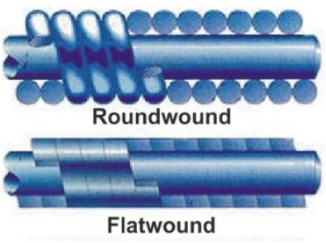
Mata Hari (parts 1 & 2)

Originally *Mata Hari* was intended to be a short piece with minimal instrumentation featuring a simple grouping of drums, Hammond organ and lap steel. However, I have long held an interest with the music of composers and producers such as David Axelrod and Johnny Harris and thought that the piece would be a suitable candidate for elaboration, expansion and development into two separate pieces of music, transforming into something completely different to my original plan. Following the Hawaiian music boom and demise of the Thirties, the lap steel has not really been used with large ensembles as a frontline melody instrument and it is only recently that contemporary players such as Roosevelt Collier have been guesting with a full orchestra; **https://youtu.be/iAx-9BiAVvI**.

With this consideration, I thought that *Mata Hari* would be the perfect vehicle for the lap steel to be used with an ensemble which featured a large string section. I intended the piece to have a sense of heightened drama that would be complemented by arranging the harmony to be supported with a heavier rhythm section. The session was tracked with the steel melody alongside drums and bass and all other overdubs, including the twenty violin, viola and cello tracks, were recorded at different stages. With the increase in ensemble size, my thoughts turned to how the lap steel would fit within the mix I thought it necessary to abandon the steel's traditional clean tone, as I needed an evenly produced sustain for long notes. Here it is worth discussing string construction, due to its importance regarding note sustain and the regeneration technique I frequently use.

The lap steel's low to high string arrangement comprise of four wound G, B, D and G strings where the construction is comprised of a plain steel string core with tightly wrapped windings around it. Either a round profile winding can be used or a steel tape winding known as 'flat-wound'. Round-wound strings produce a brighter tone, whereas 'flat-wound' strings have a dull and even response, creating a darker tone.

Figure 16



Flat-wound strings reduce friction and drag; they have a smooth finish, whereas the round-wound string is noticeably rougher to the touch and subsequently has increased friction when moving finger or slide bar. Many lap steel players, such as Christine Bougie choose to use flat-wound strings, however I quickly found that with creating longer sustained phrases the resultant friction on round-wound strings enabled the slide bar to create more string vibration when rubbed in one spot, enabling long sustained notes: **https://youtu.be/6gucejAkPN8** typical of Greg Leisz and Roosevelt Collier.

The top two strings; B and D, are constructed with a single plain steel string, similar in construction the central 'core' of a round-wound or flat-wound string. Because this has no windings, friction or drag is significantly reduced and as a result, note regeneration with bar vibrato is more difficult, although the alternative sustain technique used by David Gilmour on the high strings has proven to be successful, albeit producing a different tone; **https://youtu.be/Es_CjQ_IoBk**.

To summarise; regeneration using the bar vibrato technique, works well on the wound strings but it is not as effective on the plain strings, due to there being less string resistance against the bar. Even though the steel guitar does produce some sustain through a clean amplifier setting, the note decay on the first and second plain strings is still apparent and due to the technique of note regeneration relying on friction between bar and string, it is not as effective with a clean tone on a smooth string. The only way I could increase sustain with a full and weighted tone across all 6 strings, was to introduce an overdrive effect to the signal path and has also been addressed by other players, such as U.S gospel sacred steel players who have long used this method, along with Bill Frisell collaborator Greg Leisz and more recently bluegrass acoustic Dobro specialist Jerry Douglas who now features Lap Steel as part of his regular set up.

The effect works remarkably well, with note sustain substantially increased on the first two plain strings. Leisz has taken the idea of this balanced overdriven lap steel tone and applied it away from the more traditional territory, with the contemporary Jazz ensemble performance on the acclaimed Bill Frisell albums *Good Dog Happy Man* (1999) and *Blues Dream* (2001). Although my plan for the recordings was to feature the steel as a lead instrument, Leisz's approach on the Frisell albums is still one of support for the ensemble leader, with long drawn out note regeneration proving particularly effective creating sinewy, weaving lines juxtaposed against Frisell's clean and cutting guitar tone. Crucially, even though Leisz's role is one of support, his sound changes the entire feel of the record and so with this

consideration of the steels ability to manipulate the very texture of a recording, I decided to tackle both parts of *Mata Hari*.

Mata Hari Part 1 is directly influenced by the music of Bill Frisell and Greg Leisz, however although Leisz is an exponent of traditional finger and thumb pick technique, I felt that my bare finger technique could create a perhaps more dynamic range, utilising simple right-hand picking definition. A notable influence on this right-hand approach is U.S singer-songwriter Ben Harper, who was instrumental in my adoption of this bare finger technique. Harper's decision to not use the traditional thumb and finger picks instantly gave an earthier substance to his playing and the connection between finger and string rather than the clear picked tone used by most. Harper's roots influence along with Leisz's sensibility has proved to be a key ingredient in my outlook on the lap steel's future within more popular music fields. *Mata Hari Part 1* features a simple recording set up of steel, electric guitar, bass and drums with Leisz's influence of note-regeneration bar technique being a key ingredient to the music's delivery. Following the initial recording, I overdubbed a lap steel part using the previously mentioned technique adopted by David Gilmour, where the bar is rubbed perpendicular across the first string over a note and the signal drenched in reverb, producing an eerie and atmospheric sound when reduced in volume during mixing. Also overdubbed was another lap steel part with a tremolo effect; a device fitted to amplifiers during the sixties which rapidly reduces and increases volume, producing a pulsating effect. The rate and intensity of pulse can be easily adjusted creating some very recognisable sounds, such as the guitar part played by studio musician Billy Strange on Nancy Sinatra's 1966 recording of *Bang* **https://youtu.be/BkKDSFYvxKU.**

With this underpinning the lead lap steel part, the melody is largely Phrygian based and is echoed with both the lap steel part and the string arrangement of *Mata Hari part 2.*

The opening rubato section of *Mata Hari part 1* features the main steel part using the note regeneration technique typical of Greg Leisz's approach, as opposed to the more emotive sacred steel vibrato and resultant sustain used by Collier. Although this regeneration technique utilised by Leisz has links to the playing of Gospel Church steel guitarists, which go back to the 1950's and have been more recently popularised by contemporary sacred steel players such as Robert Randolph, its linage can actually be taken back to the originators of bottleneck slide guitar in the 1920's, which then was applied to slide Dobro guitars during the 1930's and then to steel guitar initially heard on early amplified Hawaiian music. Leisz's technique however differs from that typically used in Church music. The sacred steel technique is coupled with a wide vibrato moving note pitch above and below the target note

by quarter tones, creating an incredibly intense and emotional delivery; **https://youtu.be/oQcN2FXyeeI.** Leisz has completely reigned in the left-hand bar vibrato physical movement, creating a different, yet atmospheric and emotional sound, often coupled with a gentle pulsating tremolo effect from either the amplifier or pedal. For this, the bar is only slid in a small side to side movement of about 1-2mm; **https://youtu.be/nnr5RZbHEYo**. This creates little note pitch change but vibrates the string enough to keep the note going for as long as the player feels. By pressing the bar into the string with slight force, note volume is increased; conversely, the opposite occurs with a lighter touch and the note volume reduced. Anything more than 2/3mm back and forth movement with the left-hand bar slide and note pitch is noticeably changed and we instantly start to step into sacred steel territory**; https://youtu.be/q_C11q4Ze-s**

Another common technique I have sought to develop, which is utilised on *'Mata Hari' part 1 & 2* is the use of slid artificial harmonics[28]. Famously used on the 1959 hit record *Sleepwalk* by brothers Santo & Johnny Farina who effectively coupled the technique for the first time with a wash of reverb, it is a common technique now used by pedal steel players. A false harmonic is plucked directly an octave above the bar note utilising the thumb and index finger; **https://youtu.be/fJD1tQgoO1Y**.
This note can then be slid up and down the string, with the bar's momentum creating string vibration and harmonic regeneration through any required pitch. The original recording of *Sleepwalk* featured the Farina brothers use of clean single note slid harmonics, plucked with traditional finger and thumb picks, however by using bare fingers I found that I could very quickly skim across all 6 strings and create artificial harmonic chords which can then be slid wholly as block harmony[29]. I particularly like to use this technique with overdrive and reverb creating washes of sound **https://youtu.be/JG9yRoqH2vs** and when mixed into the background can build wonderfully textured soundscapes.

With *Mata Hari part 2* I chose to use a more overdriven tone on the steel and to place it with a large string section. Both note regeneration technique, creating sustain and the string section's bowed note generation were found to be quite compatible. Also helping this blend is the right hand 'bare-finger' technique that softens the initial attack on each note and when

[28] Appendix 1: slid harmonics chordal and single note
[29] Appendix 1: slid harmonics chordal and single note

juxtaposed against a violin/viola/cello, who have similar capabilities with note entry, they immediately blend. With *Mata Hari part 2*, the decision was made to utilise the steel predominantly as a lead melody instrument with the string section weaving harmonic lines between the melody phrases, with both strings and steel taking equal role during the modulation to the key of E major[30]. Leisz-influenced controlled overdrive was essential for this track, with choice of amplifier equally playing an important role. The search for a tractable overdrive effect amongst steel players has certainly changed over the last thirty years, from lap steel players such as David Lindley in the 1970's and '80's driving smaller amplifiers on full power to the more recent adoption of the overdrive pedal.

As previously stated, the idea to harness a lap steel to overdrive is nothing new, though clean sounds still seem to be the predominantly favoured setting amongst the larger percentage of traditionalists. Borne from sacred steel and the rise in popularity of slide guitarists such as Ry Cooder and Duane Allman during the 1960's blues boom, it's not difficult to see where the origins lie. The idea to deliberately change the tone to a more complex driven quality originated by happy accident. Low wattage valve amplifiers, such as the ten-watt Tweed Fender Deluxe[31] which were being operated on full power, creating a more rich, full sound complete with bristling harmonic overtones that is comparative to how a Hammond B-3/C-3 valve organ reacts when coupled to a Leslie 147 speaker cabinet.[32] When applied to electric string slide instruments, it gives a vocal-like quality to each note, evidence being the proliferation of sacred steel genre. However, with the advent of technology, modern overdrive pedals have largely superseded the old method of simply turning amplifiers on full power, enabling the same effect at more ear friendly levels.

During the twenty years I have been playing the steel, overdrive pedal development has proved to be truly ground-breaking. A definite progressive step was brought to the guitar community with the introduction of the Fulltone Fulldrive 2 hand wired overdrive pedal in 1996[33]. This not only gave a similar overdriven valve amp quality to note production, but it also brought a fresh dynamic response to plucked and regenerated notes. With some valve amplifiers that are used on full power, the resultant overdriven tone can lack definition and become unusable with chord phrases, but here the full tone gave a clarity or 'transparency' to

[30] Appendix 1 *Mata Hari* string arrangement
[31] Demonstration of Fender tweed deluxe amps https://youtu.be/niqzD-7cqYA
[32] Demonstration of Hammond C-3 and overdriven Leslie speaker https://youtu.be/23ey-KrqmOI
[33] https://www.fulltone.com/products/full-drive2-mosfet

each note. Even when used with a chordal approach, note separation is evident, dynamic touch is achieved and importantly, the sustain question is answered perfectly for *Mata Hari.* With most other overdrive pedals, such as the classic Ibanez TS808 tube screamer (a model of pedal dating from the late 1970's, which many subsequent imitators based their designs upon[34]), I found that a problem with the lack of note clarity and tonal depth was apparent. Bass frequencies were sucked away, but most importantly I found that certain pedals reacted differently dynamically. The TS808 and other models based on that design would not give either a satisfying clarity or the amplified signal become cleaner if the strings were plucked lightly. The Fulltone Fulldrive immediately gave this dynamic response, purely by touch; when a note is plucked hard, the signal is full and round, conversely when the string is plucked lightly, the direct tonal response is immediately there and the signal through the amplifier cleans up; **https://youtube/2jYPUQLzNyQ.** I found that this worked perfectly with the lap steel and has now become an integral part of my recording and live set up.
It must be said however, that the answer to recreating overdriven tones, does not just lie with the pedal itself. The combination of the full drive and a valve amp is essential. When played through a transistor amp, the results are not as pleasing to the ear, the signal is too harsh and unforgiving. The full drive was designed to complement the tonal qualities produced by a valve amp without having to resort to using them at ear splitting volume levels. For this track I used a replica of a 1959 Fender Tweed Twin: eighty watts and two twelve-inch speakers. The resultant room tone was loud and full, but not overbearing.
Mata Hari Part 1 was treated differently. Inspired by the work of Bill Frisell, the opening rubato section features lap steel volume pedal swells, harmonic slides and a particular note regeneration technique used by Pink Floyd's guitarist David Gilmour on the improvised piece *a Saucerful of Secrets* from the *Live at Pompeii* video[35]. The bar is held at a slight angle on a particular note with either the right or left hand and is rapidly moved perpendicular across the string; **https://youtu.be/Es_CjQ_IoBk.** This technique is quite different to the more traditional left-hand bar slide note regeneration techniques I have previously discussed, where the end underside of the bar is moved side to side on a string**.** Because the left hand is operating the slide across the string without any string damping, harmonic overtones create a curious atmospheric and delicate ghostly effect. This technique can only be used on the outside two strings as the slide bar cannot have contact with any adjacent strings. If the bar

[34] https://ts808.com/
[35] Pink Floyd, live at Pompeii https://youtu.be/rk2AXXHfV3M

was positioned flat across the strings, then all strings would vibrate, destroying the desired effect. Whilst in motion, the bar can be moved from note to note without a break and is particularly effective when saturated with reverb and mixed with the rest of the track at a reduced volume.

Recorded through a tweed Fender Deluxe amplifier, the opening lap steel melody echoes some of the accompanying guitar phrasing that is influenced by any of the Bill Frisell *Blues Dream* album tracks. However, where Greg Leisz rarely takes the full melody, the focus on the steel is instantly brought to attention as roles between it and the guitar seem to swap and intertwine, with the steel forcing through the melodic line. The melody on *Mata Hari Part 1* is approached slightly differently to the other five tracks, in that a volume pedal is used to give sudden swells and fades to notes and chords. Volume pedals are a typical part of a steel guitarist's set up and is why I have eschewed using one on the other five pieces, however with this piece I felt it was warranted, due to the unusual melodic application of the steel. I thought that the tune's major/minor tonality needed to be hidden and even though the main body of melody is mostly derived from G Phrygian, played over a sustained G chord with no third, the omission of a Bb perhaps creates a harmonic ambiguity which leaves the overall feeling of unsettlement.

The same call and response relationship combined with a similar major/minor ambiguity between instruments can also be heard on *Mata Hari Part 2* with the steel and string section crossing each other until finally being brought together during the modulation to E major with the melody from *Part 1* being returned. The piece concludes with a return to a small ensemble setting of bass, drums and piano replicating the ostinato bass line, but with the steel playing the melody with a forceful, overdriven tone. The accompanying string arrangement stops at this point as I wanted all the focus to be concentrated on the steel melody and overall tone. Slid harmonics round off *Part 2*, creating the impression of resolve.

With *Mata Hari Part 2*, my intention to research how a lap steel could combine a strong and dominant lead melodic role whilst still being able to blend with a large string section and see if its interactional relationship with these other instruments would present a strong case for further development. I felt it worked incredibly well in that the tonal relation between the lap steel and large string section proved to be very compatible with the flowing phrasing of a slide instrument working with, rather than against the ensemble. The idea of using the instrument within a through-composed framework also is proven to be successful the call and

response sections create an emotive tension that is released with the modulation to E major[36]. With large ensembles consisting of different instrumentation, I think the possibility for further exploration is more than feasible.

With Bill Frisell's album *Blues Dream*, the lap steel is featured with a small brass and woodwind trio with a guitar led rhythm section and works incredibly well. I could fully envisage a similar path emerging with the melody employed in *Mata Hari Part One* but on a much larger scale.

This piece was initially intended to be an introduction however, it grew into a piece that brought about many possibilities. I wanted to record something that carried on from Greg Leisz's work with Frisell; something that captured a similar feeling but gave the lap steel a much more prominent role than anything they had recorded. I argue that Frisell had created a new direction for Jazz and with the *Blues Dream* album, was bravely covering new territory incredibly successfully. but whose tenure and future progression as an organically growing ensemble, terminated abruptly; it needed re-evaluating. With *Mata Hari Part One* my initial response was to simply embrace this cinematic direction with lap steel at the forefront, however after some consideration I felt that it would benefit greatly with the addition of brass, woodwind and large string ensemble, carrying on the idea of furthering large ensemble/lap steel interaction. As a strong platform for through-composition and improvisation created by Frisell and Leisz, this relatively new sub-genre of Jazz, blending country, blues, cinematic themes and avant-garde Jazz is one area to expand upon without question.

[36] *Appendix 1, Mata Hari string section arrangement.*

Chapter 6

The Star-Crossed Lovers

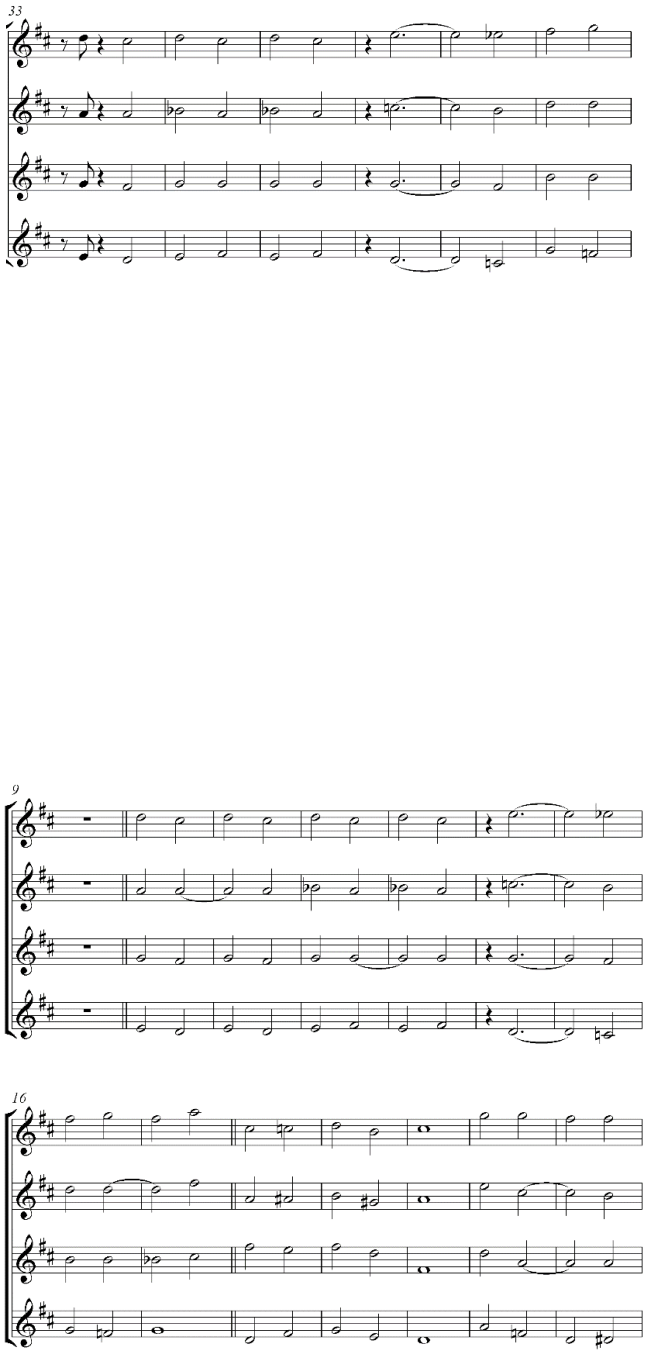
The vocally emotive characteristics of slide guitar have been a long-recognised attraction to the instrument and have influenced technique through means of vibrato and picking dynamics. Since the advent of amplified steel guitars during the thirties the further manipulation of tone has since been a well-travelled path and certainly from the days of Alvino Rey and his 'talking steel guitar' [37] the adding of effects to the amplified signal has substantially increased the instrument's dynamic range and application. With *the Star-Crossed Lovers,* I initially wanted to reach back to the basic approach of an unprocessed amplified lap steel tone and see if just the bare finger technique and bar vibrato could have significant results with melodic phrasing, without referencing any of the traditionally associated music forms. I wanted to feature the steel in a leading melodic role which sat comfortably with the other submitted recordings but had different direction. The choice of suitable material was not difficult; One recording I have returned to for inspiration time and time again is Duke Ellington's album *Such Sweet Thunder* which featured the Billy Strayhorn composition *Star Crossed Lovers*. I chose this piece of music, purely because of the impact that Johnny Hodges alto saxophone playing had on me as a young boy and my desire to try and channel Hodges' dynamism on guitar. Long before I played the lap steel, this more than any other piece however drew my attention to the conventional 6 string guitar's limitation regarding note duration/natural decay. The lap steel seemed to answer this problem perfectly and therefore the tune seemed to be such a strong vehicle for the instrument to emotively emulate Hodge's vibrato and note length.

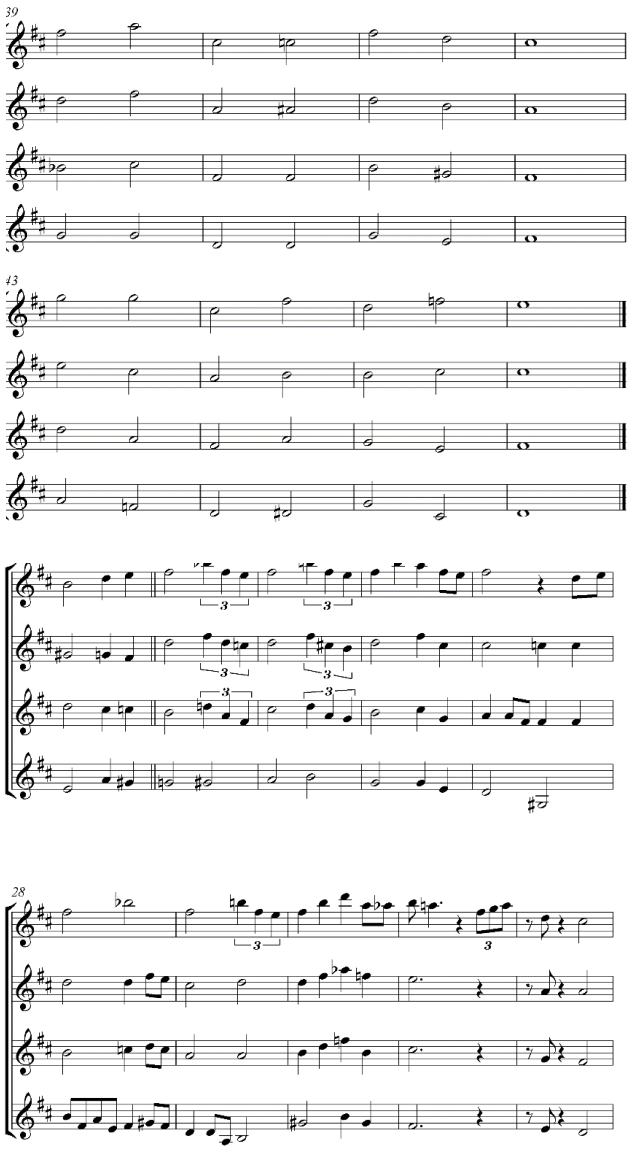
[37] https://www.fretboardjournal.com/columns/brief-history-talking-guitar/

I decided to eschew the conventional polyphonic nature of the instrument and instead to focus only on its single note capability. After consideration, I recorded most of the melody on my 1954 Fender Champion steel, an instrument that has a single coil Telecaster pickup in the bridge position. As mentioned, I initially chose not to use effects with this melody, however I was conscious that my take on Hodges' voluptuous tone could be severely compromised. As with most Fender instruments, this instrument is a very bright sounding steel, however I thought that the resultant clear tone played straight into the amplifier worked well and that it gave a strong prominent setting over the underlying rhythm section parts. My other steel, a 1951 Gibson BR-9 has a different tone, one which sounds full and powerful; however, it does not have the clarity of the Fender steel and as I felt that I needed as much definition to the melodic delivery as possible, the Gibson was used for the supporting overdubs. After experimentation, I also thought that my revised right-hand technique of utilising 'bare' fingers instead of the traditional finger pick/thumb pick use would offset this potential problem and to a point, it worked. The persistent problem was however highlighted that a bridge pickup will always be less tractable compared to a pickup that is located further along the string where string vibration is greater, giving a softer, more pliable perhaps more dynamic tone. Amplifier choice was important as it is the last and perhaps most important link in the tone chain. My Victoria amplifier with a fifteen-inch speaker produces a sound with excellent lower frequency response whilst maintaining a high frequency definition. When playing this melody, most of the work was done focussing on left hand technique with the tone bar. Just by gently rubbing the bar, it gives a gentle vibrato to a note, but crucially also 'regenerates' the note, effectively ridding the aforementioned problem of natural note decay; a feature that has been utilised on the other recordings. The application of a Hodges influenced vibrato however trod a fine line between restraint and the emotive and wide Sacred Steel vibrato. A compromise was found which lay directly between the vibrato of Greg Leisz and that of Roosevelt Collier, which enabled a quiet intensity without ever losing the piece's calming essence. Hodge's glissando phrasing proved as I had imagined, perfect for the steel and a combination of 'note regeneration' vibrato and glissando movement to other notes works incredibly well, creating an
almost breath-like quality to certain passages. My right-hand picking position had to move forward to the central area of the strings, where vibration is at its greatest, just to achieve a tone that was not harsh but could be dynamically responsive whilst retaining definition. Along with Hodge's melody, the original Ellington recording featured the saxophone section gently underpinning the harmony with long minim note phrases. It is with this in mind, I

chose to write four close part harmony backing figures in a similar vein to the Ellington piece, but all individually recorded as four separate tracks on the steel.

figure 17





For this, I needed contrast as using the same instrument for both lead and harmonic support was tonally similar, so I opted to use the darker sounding 1951 Gibson BR-9 with a bridge mounted P90 pickup. I tried recording the supporting parts direct into the amplifier with a clean tone, but this still did not support the tone of the lead melody track, plus note sustain was not satisfactory. To change the tone colour further, I employed the use of the Fulltone Fulldrive overdrive pedal and recorded four parts that utilised a slightly distorted tone but enabled better sustain. However, overtones were created between parts and the harmony just did not sit well with the melody.

It simply did not work satisfactorily. I found that whilst harmony lines recorded separately, do work when used as the main melody, as with the submitted piece *Mercy*, it was simply too much to have a prominent sounding steel playing a single line melody whilst similar textures were being used, albeit in a different role underneath. I was ready to wholly scrap this approach and just use the melody when I decided to rethink the whole approach. Whilst the

tone used for the melody worked, it bothered me that the four-part harmony tracks were wasted purely because of tonal issues. The answer was to change them into a wholly different textural role. By using standard studio effects as a tool to change the voice of four instruments, I decided that I had to reduce the impact of the underlying harmony parts even more by reducing their overall volume and then saturating the four-track signal with plate reverb. The result was an interesting shifting texture that lifts the melody as it enters the B-section, without tonally challenging the lead part for dominance.

It was here that my original intention to just play the part direct through the amp also changed. The last A section to the end, I thought that the treatment of the melody would benefit with the very gentle use of an auto envelope filter, giving an even more vocal approach to the lead line. There are both manual and auto pedals that achieve this effect, however I decided to go with the auto effect as it reacts well to right-hand picking dynamic. Again, this just did not sit with the rest of the piece, so the decision was made to simply play the Fender lap steel through the Fulldrive pedal, with overdrive levels reduced but still operating at a boosted level to create a more intense dynamic tone for the final section. I had been reticent to use overdrive as I felt that the combination of a wider vibrato and distortion would produce a feeling closer to Sacred Steel and which ultimately would be too intense for the track. Because the supporting parts had now changed function, a slightly overdriven lead tone over a reverb saturated overdriven harmony part worked well.

The B section at bar 24 also needed a change in tone and dynamic, as I felt that part needed to at least echo the Ellington recording, which lifts with the ensemble entry. Initially I opted to use a four-part harmony and it worked, however I felt it detracted from the rest of the recording and ultimately seemed out of place. Therefore, simplicity dictated that only two parts were needed to enable a stronger focus on the melody; a sweet two-part melody was achieved using the Gibson lap steel to contrast against the Fender's A section melody playing.

Star Crossed Lovers initially started as a project to research how the lap steel could function in a lead melodic role away from traditional territory without compromising basic tone. Although this worked, the secondary idea of harmonic support ultimately created a new direction. By reverting to a textural harmonic role, the implications for future studio application are far reaching, with the steel potentially creating a different type of support instead of a conventional instrument grouping playing underlying harmony lines. Regarding this textural approach, my study was only concerned with the relation between four-part harmony combined with overdrive and reverb saturation; this is open to further

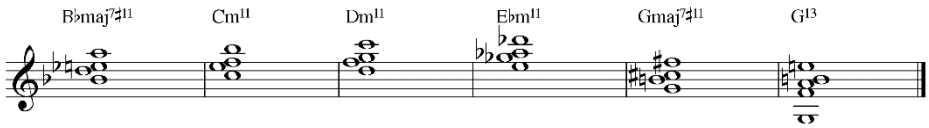
experimentation, however the options to record any number of effects with a multi-tracked lap steel are open to research. With the lead melody, a slight change in both right hand finger and bar vibrato techniques resulted in a softer, soulful sound that can be applied to other types of recording. By thinking about how a wind instrument phrases just by the physical nature of its operation; breath length and its dynamic contrast, along with glissando effects between notes, the lap steel can mimic these techniques and ultimately start to develop its own voice away from the staple country, Hawaiian and Church backgrounds. Although the sacred steel genre aims to replicate the intensely emotive vocal phrasing of the choir, it can be changed just restraining the vibrato and picking dynamic, creating a differing vocal quality, this phrasing can be adapted to new lead melody areas. This enables the instrument to feature in a range of performance styles and not sound out of context or appear to be a forced application.

Chapter 7

Mercy

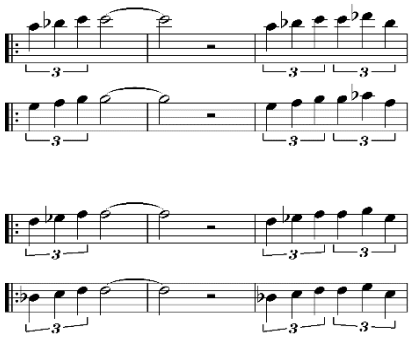
Mercy is an original composition which was initially written to reference the music of contemporary American East Coast Jazz musicians such as alto saxophonist Kenny Garrett and the late trumpet virtuoso Roy Hargrove. Played over a 12/8 Afro-Cuban feel, written as quaver triplets across 4/4 time, the melody was written using close harmony voicings inspired by guitarist Johnny Smith's adaptation of piano chord voicings which when applied to guitar, consist of wide stretches to enable close intervals to be stacked in block form.

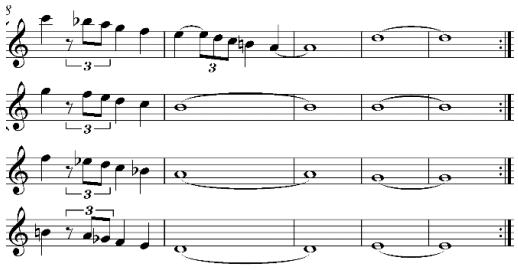
figure 18



This could not be applied to lap steel due to the restriction of the open tuning of GBDGBD and the relation of the bar to the stacked intervals across the strings of two major thirds, a fourth and two more major thirds; even with bar slants https://youtu.be/7XYY41-C95w these chords cannot be achieved in a satisfactory manner. I had initially thought that if the steel was tuned to standard guitar tuning (EADGBE), then it could possibly be achieved in two separate recordings with the steel playing the first two melody lines in fourths and then the other two parts necessitating some extremely tight bar slants. Following some experimentation, I quickly found that flow, intonation and the overall clarity would have been severely compromised if this method had been pursued. Thankfully with the benefit of today's multi-track digital recording programmes to hand such as Logic X and Pro Tools, the decision made was to treat the melody with the same approach one would take with a string section or saxophone section. Unfortunately, with only myself available to play all the parts on the recording, I realised that each part had to be tracked separately, however in doing this I found that a lap steel ensemble is a possible area of exploration providing experienced players could be located, as I'm confident that the instruments would work and blend well together in a live setting. So as a solo instrumentalist approaching the recording, the only way that the desired effect could be achieved was to record four parts separately. The initial recording consisted of us all tracking live with me playing the melody on electric guitar to keep a general sense of unity. I then wrote out individual parts on Sibelius and then layered

each part on the pre-recorded track starting with part four and then working upwards. I chose to end the ‘A’ section with the resolve to G13 and then G6.





I opted to use a conventional clean tone for the harmony passage as I knew that any overdrive or effects would simply clash and create overtones when stacked as individual recordings. I recorded the steel parts with a Victoria Victorilux forty-five-watt valve amplifier and used no effects. I chose to use the amplifier’s valve characteristics with it being operated just below half power. This gave each note a warm quality without distorting due to natural valve overdrive when amplifiers are run on full power. This amplifier has a fifteen-inch speaker and produces a significant amount of volume which worked well in a large live room. Recorded with a ribbon microphone placed a metre away from the speaker and a large diaphragm condenser microphone placed two metres from the speaker to capture the room sound, the set-up worked extremely well and gave an engaging texture to the melody. I opted not to use the dynamic overdrive feature of the Fulltone pedal https://youtu.be/2jYPUQLzNyQ as I had previously found on the submitted recording of *star crossed lovers*, that the overdrive effect did not lend itself well to slide playing when layered as four-part harmony, due to harmonic overtones created by the distortion clashing along with

the subsequent reduction in overall definition. Even with a slight amount of overdrive, the desired effect of four individual working melody parts is somehow compromised, so I had to run the lap steel signal direct to the amplifier, bypassing anything that could degrade the sonic relationships between notes. However, with *star crossed lovers*, it must be said that this degradation was found to be still useful, but not as a prominent harmonic feature, instead more as a textural tool. The clarity of the melody therefore created a relaxed theme which sat well over the energy of the rhythm section. When applied over an ostinato bass line in G, each chord gave its own individual harmonic tension and release, starting with Bbmaj7#11/G, which could be also seen as Gm13, rising to Cm11/G and particularly the Ebm11/G resolving back to Dm11/G, ostensibly a G7sus4, that in turn had its own tension and release to Cm11/G, with the sequence resolving to the major tonality of G13 and finally with the b7 release to the lighter palette of a simple G6. The arrangement is straight forward with the four-part melody staying true to the original harmonic idea, however with hindsight, this area could have been developed much further and opens the question about how far can we take harmonic interplay with multi-tracked lap steel guitars? I am certain that anything is possible providing that the instrument tones are compatible and have no obvious clashes of timbre, frequency and of course intonation, much like the interaction of a string quartet. After recording the melody, I felt that *Mercy* needed additional melodic interest, so another lap steel part was added, but this time with overdrive and a wah-wah pedal https://youtu.be/v8loYPYAP7s to make a stark contrast against the clean tone used with the four-part melody. I subsequently drenched this take in reverb and then reduced the volume level within the mix and found that it created a pleasing transparent effect. With this take I utilised many techniques, including note sustain/regeneration https://youtu.be/6gucejAkPN8, the sacred steel vibrato technique https://youtu.be/oQcN2FXyeeI and the trill effect https://youtu.be/T4Sj-qMbE-0 of bouncing the slide bar rapidly on the string whilst manipulating the tone with the wah-wah pedal.

Slid harmonics https://youtu.be/fJD1tQgoO1Y are featured throughout *Mercy* with the reverb and wah effects really bringing out the whistling treble frequencies of this technique.

The B section was recorded with two lap steel takes; the first take is the main melody and is a continuation of the A section melody regarding phrasing and tone. The B section features a call/response with the effected lap steel take with both parts featuring bar slides between notes. The whole of the effected lap steel part was completely improvised and recorded in one take. It creates a sinewy, weaving sense of unsettlement which contrasts well against the dream-like wash of the melody.

Mercy ultimately gave credence to the idea that multiple takes of lap steel can be layered for the purpose of creating harmonies that otherwise would be impossible with one instrument. Even the pedal steel with its ability to change the pitch of simultaneous strings, would perhaps struggle with more complex chord passages; however, by using layered lap steel tracks, virtually anything is possible. Problems have arisen concerning the choice of tonal characteristics during layering; overdriven tones were found to have compatibility issues when stacked on top of each other in a mix and clashed with unpleasant overtones. I found that a regular clean, unprocessed tone had the best application, providing the instrument, amplifier and picking dynamics remain consistent; with this simple and direct approach, complex interweaving harmonies can be realised. With the steel's strength lying with sustain, arrangements that have a more vocally phrased approach would be a definite possibility and the examination and influence of more advanced vocal quartet material by artists such as The Four Freshmen could further this application. Even considering how string quartet arrangements could be adapted for lap steel is an area worth expanding upon, although it would be a more limited choice due to problems arising with the articulation of note groupings. Nevertheless, adaptations of quartet material can be undoubtedly realised and although the range of the Cello is outside the scope of the lap steel, four-part harmony is still workable.

Chapter 8

Petite Ouverture a Danser

Composed by Erik Satie, *Petite Ouverture a Danser* was originally written for solo piano, however after hearing pedal steel musician B J Cole perform Satie compositions as part of a small ensemble on the album *Transparent Music*[38] I thought it suitable to adapt *Petite Ouverture a Danser* for lap steel. With *Transparent Music*, Cole took the compositions of late nineteenth century composers such as Satie and Debussy and rearranged them for multi-tracked pedal steel and minimal accompaniment with interesting results. Here, B J Cole plays his version of Satie's *Gnossiennes Number Three;* https://youtu.be/57l7rl1qLXE. Cole's adaptation of these pieces has been a key work for progressive pedal steel guitar, however since the release of the album in 1989, there has been no follow-up. With consideration, I thought the subject needed to be readdressed and to see if the lap steel could be used as another way to reignite interest for such adaptation. Satie's more popular compositions such as the *Gynopedie* and *Gnosiennes* represent as John Cunningham says, a break from late nineteenth century Romanticism and was "Closely allied to the Dada and Surrealist movements in art, it refuses to become involved with grandiose sentiment or transcendent significance, disregards traditional forms and tonal structures"[39] *Prelude a Petite Ouverture a Danser* is no exception. The original composition has little repetitive form and its harmonic structure moves around with no serious attempt to develop the melody[40]. However, whilst intentionally ambiguous, what melody there is proves to be strong and worthy of redevelopment when applied to an ensemble setting.

Prior to the presented arrangement, different approaches were considered. Initially, I was to record a duet with piano remaining faithful to Satie's writing, however following a discussion with Dr Robin Dewhurst, it made better sense to adapt the piece for a completely different setting. The next step with *Petite Ouverture a Danser* was to simply take the lack of traditional form and juxtaposed it over a continually repetitive 12/8 Latin feel, but even then, I felt that it still did not work satisfactorily; the changes were too abrupt, and flow was compromised. With added percussion and repetitive rhythms underpinning the melody, the

[38] Hannibal Records: HNBL 1325: UK: 1989
[39] https://www.britannica.com/biography/Erik-Satie
[40] *Appendix 1*

piece undoubtedly needed a clearer structure with the decision at this point, to repeat the first ten bar melody at the beginning and end, interspersed throughout by an additional four bar original melodic interlude played with single note slid harmonics, consolidating the different sections. The result gives a better flow and harmonic sense to the piece.

Regarding instrumentation choice, I finally opted to use the combination of lap steel, double bass, drums, percussion and a minimal piano accompaniment, with the lap steel playing the entire melody using combinations of single line and note clusters. Satie's harmony on *Petite Ouverture a Danser* is quite simple and as it was being turned into a contemporary jazz influenced piece, a loose arrangement was worked out with chord symbols written out[41] and linked to the melody line. By examining Satie's chord inversions and writing them out as a progression, I found that I could readily experiment with positional playing on the lap steel and eventually reach a satisfactory decision regarding chord and melody note combinations and although I had included a basic piano accompaniment on the recording, I still wanted the lap steel to provide a proportion of the underlying harmonic information. Regarding the overall feel of the arrangement, I thought of the approach taken by Christine Bougie with her ensemble, where melodic sensibility becomes the goal. I had thought of including an improvised section to *Petite Ouverture a Danser*, however this became a moot point as my natural inclination as a jazz musician was to include some reference to improvisation, however I was just not hearing any development in that direction at all. After listening to Bougie, the decision became clear; aim for melodic interest. Although a keen improvisor herself, Bougie has adopted the thought of just playing an instrumental composition as a song, rather than padding out space and time with improvised sections for her last two albums. With this, the focus on melody becomes paramount and the "default position of filling space with improvising is removed" … ultimately creating a place to make new music that exists "between soundtrack and song"[42].

Without the weight of an improvised passage, the piece immediately took on a new direction and with this, the delivery of the melody in a relatively simple form also dictated a straight-forward choice for tonal characteristic. With this melodic consideration for the overall piece established, I felt that the four-bar refrain should also have a strong identity and reference to

[41] *Appendix 1* Piano score
[42] https://soundcloud.com/northernstatic/ep-04-christine-bougie

the Santo & Johnny recording of *Sleepwalk* can be heard with the use of slid harmonics playing a simple melodic line. The use of this refrain underpins the arrangement and creates a definite breathing space between sections, helping the overall relaxed dream-like quality of the piece. Retaining the original feel of Satie's piece, I felt was important and needed to be treated with a sense of continuity, so thoughts turned to how the melody was to be played and with what sound consideration. I opted to use the Gibson lap steel into the Fulltone FullDrive pedal and then straight into my Victoria valve amplifier which as a fifteen-inch speaker and has a built-in spring reverb producing quite an encompassing sound. The Gibson lap steel produces a clear and full tone, comparative to the Fender's much thinner tone and as a result, the use of this steel with the Fulltone pedal's dynamic response required the lap steel's volume to be set halfway combined with the careful use of picking dynamics, otherwise the overdriven sound would reduce clarity. The sound achieved was not crystal clear, but still had definition with good note separation when applied to chords. Rather than just opting to use a clear 'clean' tone, I felt that the slight amount of overdrive gave a warmth and colour to the sound. The reverb added depth and flow to the melody; an effect that was increased for the harmonic refrain. As a result, the lack of overall effect saturation returned the lap steel to its original tonal origins from the nineteen forties and fifties and the piece became focused on instrument application within a new genre and ensemble setting. I feel that the application proved successful and the marriage of the lap steel with impressionist era compositions is certainly one to be further explored.

With the vast catalogue of music written by composers such as Satie, Debussy, Faure, Delius, Ravel where space, texture and colour are given equal attention to harmonic construct, I have long felt that many possibilities for expansion exist here for the instrument. Following on from hearing pedal steel guitarist B.J Cole's adaptation of Satie's *Gnossienne Suite*, I was seriously considering a reworking of Vaughan Williams' *Tallis Fantasia* for lap steel, when I learned of North West English musician Tom Doughty who had performed in a small orchestral setting with amplified Weissenborn and National Resophonic acoustic lap slide guitars. Although Doughty's adaptation was to take an orchestral piece and insert an improvised section, it confirmed my idea that the electric lap steel could be part of the ensemble proper and ultimately take melodic responsibility. My initial idea for the *Tallis Fantasia* was to take the basic melodic and harmonic structure used over the first quarter of Vaughan Williams arrangement and apply it within a contemporary setting with acoustic rhythm section consisting of drums, double bass and piano and treat it with an influence from

both Ry Cooder's *Paris, Texas* soundtrack and a strong reference of Ennio Morricone's output from the nineteen sixties. My personal consideration for adapting Vaughan Williams' rework of the original Tallis composition originated from hearing its resonance with Morricone's works such as *Ecstasy of Gold* where the achieved sense of drama, beauty and emotive delivery could be applicable to the lap steel in small or large ensemble setting. With *Tallis Fantasia,* the melody is so strong that my initial idea was to simply adapt it for a duet with piano; the realization that this could be applicable to many other works opened the question of how far removed from an orchestral setting can these works be applied to new arrangements?

The choice to look at redeveloping some of Satie's compositions came directly from considering B.J Cole's approach. Cole last recorded any of this material in 1989 and I thought that this idea needed reappraisal. Satie's use of dream-like wandering melodic phrasing were prime contenders for a lap steel application and after recording *Petite Ouverture a Danser* the sense of possible outcomes with alternate ensemble line ups became apparent. I chose to stay true to Satie's original sub-melody harmony, however the question arose that once a melody and its underlying harmony is established, then how far can this underpinning harmony be changed, whilst still retaining a recognizable identity? Further to this, could using effect pedals have a positive impact on an established piece of music without detracting from the focus of the melody, or will they have negative outcome? Personally, I think the former; concerning the submitted recording, one adaptation I seriously considered following the session was to have the lap steel washed in reverb/delay and used with the volume pedal to create textural swells, whilst being accompanied by harp, string quartet, double bass and drums. This alone brought in the realization that if melodic, harmonic and emotional strength are present, I believe many pieces could be arranged to encompass the lap steel without losing authenticity.

Chapter 9

Weasil

The final piece I have chosen to record is a loose arrangement of the Charles Hendricks tune *Weasil* recorded by Donald Byrd in 1969. As a twelve-bar groove-based piece, *Weasil* is typical of the era highlighting the change in direction for Jazz, brought about by the soul and dance music influences from sources such as the then-popular Stax and Atlantic labels and the sales success of the 1965 Blue Note recording *The Sidewinder* by Lee Morgan https://youtu.be/jAncCc1uhfI. This influence has remained to this day with Jazz musicians frequently adopting contemporary groove influences from Weather Reports' seminal recordings, through to the Acid Jazz movement of thirty years ago and more recently collaborations with Hip Hop and Urban musicians, featuring artists such as saxophonist Soweto Kinch and Corey Henry. Because of this historic linage of groove-based references within the Jazz improvisation genre, I thought *Weasil* to be a workable vehicle for the lap steel as it not only brings a new sound to soul-jazz, but also adopts more of the recent sacred steel influences such as pedal steel player Robert Randolph and most recently the energetic performances of Roosevelt Collier who predominantly features lap steel in his live shows. Whilst considering the historical effect of soul-jazz, the decision was made to apply the lap steel in the Hammond trio format with Hammond C-3 organ and drums. The classic Hammond trio format first popularised during the late nineteen fifties by players such as Jimmy Smith, and Jack McDuff, immediately defined the sound of soul-jazz, by bringing the sound of the Gospel Church into improvised music. The Hammond trio undoubtedly paved the way for the more progressive sounds to emerge during the late nineteen sixties and seventies. The organ trio usually formatted with electric guitar, organ and drums has subsequently been incredibly successful over the past sixty years and so the simple replacement of the guitar with lap steel seemed to be a logical and ultimately successful step. Whereas the original recording featured a full rhythm section, complete with Wurlitzer electric piano and a tenor saxophone/trumpet front line, https://youtu.be/P_FeSOb-z8Q Byrd's original version of the tune is clearly influenced by the Cannonball Adderley quintet's seminal soul-jazz recordings from the mid-sixties. Like Adderley, Byrd has opted for the use of a Wurlitzer electric piano and a drum groove that would not be out of place on a James

Brown soul recording. Indeed, the sixties marked a historically important change within Jazz; following the 'British Invasion' of the Beatles, Rolling Stones, jazz was quickly becoming an irrelevance for the youth of America and as jazz vocalist Carol Sloane says, "I could see the writing on the wall with the Beatles. The kids had been drifting away from jazz for years. But by this concert in 1965, they were completely gone, and I knew they were never coming back. You could see it. You could hear it."[43] As a reaction to popular music, jazz artists started to bring in contemporary influences, especially from soul and Motown music. Part of this gradual shift involved the organ trio and as such, it quickly became the defining sound for the soul-jazz movement of the sixties, with artists such as Jimmy Smith, Larry Young and Jack McDuff paving the way for new approaches and introducing new stars of the genre such as George Benson. https://youtu.be/ilMWCMu4Szc

Whilst I thought it was important not to just produce a carbon copy of a bygone era, the historical link between church music and soul jazz cannot be ignored. Just by adding a new instrument to the established set up instantly creates a familiar, yet contemporary approach. The combination of the steel led trio with a sacred steel tone gives a vocal quality to each note when used in conjunction with overdrive and vibrato. Both Randolph and Collier feature a gritty overdriven tone with a wide left hand bar vibrato which I duly applied to *Weasil,* however I decided to go a step further with the addition of a wah-wah pedal, which I felt lifted the improvised solo section to a more intense feel https://youtu.be/v8loYPYAP7s . Other areas of music have adopted this sacred steel approach with acts such as Larkin Poe[44] using the lap steel in a blues-rock setting. https://youtu.be/e5-NxtiP0_k. Considering that the lap steel has been successfully adopted within the church music genre, it remains somewhat of an outlier for both 'standard' Blues and Jazz formats with odd exceptions from musicians such as Steve Cunningham Well You Needn't-Thelonious Monk/Oahu Diana Lap Steel. With *Weasil,* the idea of using the instrument as an interactive improvisational tool which borrows influence from several sources became a tractable and realistic goal.
With such a strong and direct tone from the steel, coupled with the encompassing sound of the Hammond C-3 through a Leslie 147 speaker, the resultant overall sound is full but not overbearing. *Weasil* was recorded completely live, with all three musicians in the same room

[43] https://www.jazzwax.com/2009/03/interview-carol-sloane-part-4.html

[44] https://www.larkinpoe.com/

and was mostly improvised with a very loose idea of the arrangement being discussed immediately before the session commenced. By adopting this relaxed approach, I wanted to bring in some of the sacred steel influences I have previously mentioned to the project and whilst referencing some of the techniques developed from the Greg Leisz approach, I thought that incorporating a more energetic and spontaneous feel would complement the other five tracks, giving a good account of the dynamic range from the instrument when used with valve amplification, overdrive and simple effects.

The piece opens with the note regeneration technique, which I have adopted from contemporary acoustic slide Dobro players such as Jerry Douglas, Rob Ikes and electric steel players such as Greg Leisz and Ben Harper. However, unlike the Greg Leisz subtle controlled approach, within the first opening 10 seconds, you can hear the vibrato becoming wider as the note continues to sustain. This involves a gradually wider lateral bar movement, with a corresponding increased downward pressure, allowing volume increase and a build of intensity https://youtu.be/q_C11q4Ze-s

Just with this slight change of bar movement, we instantly start to move into sacred steel territory. With *Weasil* my idea was to take a harmonically simple twelve bar sequence, like gospel music, but with a historical Jazz credence and apply a mix of subtle Leisz-like techniques in conjunction with the more emotional Church phrasing. This approach has already been introduced to the wider steel community via the music of people such as popular music artist Ben Harper. Harper is a key connection between this arranged sensibility via his pop/rock releases and the wild emotive playing of the sacred steel genre. Although he predominantly alternates between guitar and Weissenborn acoustic slide, Harper frequently uses his electric lap steel in conjunction with effects and it was with this in mind I opted to use a wah-wah pedal, which substantially changes the overdriven tone, significantly boosting the treble frequencies and allowing harmonics to be projected clearly**.**

Harper's Weissenborn playing also has an important relevance to the steel community as although it is an acoustic instrument, his attack and energy can easily be transferred to electric steel. However, despite the importance of his influence, Harper, being a prolific singer/songwriter only uses the steel in short bursts, alongside the acoustic Weissenborn guitar and regular acoustic and electric guitar to complement the song. With *Weasil* I decided

to make the piece purely about the steel and adopt the continual improvisational aspect of a jazz performance.

Whilst considering Harper's influence, I also started to think more about influences away from the lap steel. As with *Star Crossed Lovers* where the gentle vibrato of alto saxophonist Johnny Hodges was referenced, my approach to *Weasil* borrowed heavily from other musicians, particularly the music of Jimi Hendrix. Hendrix's use of the Fender Stratocaster's vibrato unit, coupled with searing overdrive enabled him to create wild, sustained note falls. I found that with the wah-wah, overdrive and left-hand slide bar technique, I could replicate this. By moving the bar in a particular manner, the resultant sound gives the same effect as either a guitar string bend or heavy vibrato unit use. https://youtu.be/BKW5iRQQf-E. As *Weasil* develops, the overdriven tone increases, in turn, raising the overall energy level of the track. Hendrix's use of the wah-wah pedal enabled an even higher intensity and with this in mind and timed at the right moment, it gave incredibly positive results.

The 'wah-wah' section at 3:40 opens with a technique I adopted from both guitar and the sacred steel genre, which is the rapid 'hammer on/pull off' technique that gives a fast 'trill' sound. When applied to the lap steel, the bar is quickly bounced up and down on the string, https://youtu.be/T4Sj-qMbE-0

and is only really heard on the more contemporary sacred steel recordings by players such as Robert Randolph and Roosevelt Collier. Collier is a new face for the instrument and has had moderate success both in his home country of the U.S and Europe. Whilst his name is new to most, I think he will continue to be a key developer in the push for new sounds and approaches for the steel, as Collier, more so than Randolph, has embraced the improvised Jazz element and seems comfortable within this role.

With the influence of Leisz, Harper, Collier and Hendrix over the course of the recording, I decided to use a dynamically 'stepped' approach to the arrangement, with the wah-wah pedal just pushing the tension that little bit further than an already overdriven amp tone during the loudest section. To develop this even further, at 3:56, I also decided to use the picked harmonic technique, which has been used on the other recordings, however with the wah-wah pedal accentuating treble frequencies and then coupled with overdrive, the octave harmonic slide really stood out. At 4:00, another technique is used which highlights one of the advantages of playing the steel with bare fingers rather than traditional thumb-pick and steel fingerpicks. The right-hand thumb and index finger, when used without thumb or finger picks

can quickly alternate between two adjacent strings and crucially, can produce this technique at any dynamic https://youtu.be/2jYPUQLzNyQ With the bare finger technique, I also found that my fingers could get substantial leverage underneath the string and produce a full tone at speed. Achieving this same effect with thumb and finger picks is not particularly satisfactory as the flesh of the fingers produces a much more satisfactory tone. Whilst this technique is being used, the bar can be slid giving a rising 'warbled' glissando effect[45]. This rapid thumb-fingerpicking, coupled with overdrive is my attempt to emulate the blues harmonica playing of artists such as Little Walter and Sonny Boy Williamson who were able to create this effect by rapidly moving the harmonica side to side whilst being blown https://youtu.be/SvLXnmKR-90, and again is another viable technique to raise the energy of a track.

The final part of the piece at 4:48 is a reference to the opening section and features a sudden drop in volume. It is here you can hear the contrast of right-hand finger dynamics in conjunction with the response of the Fulltone overdrive effect. The amplifier and lap steel volume controls were set at a particular level for the whole recording and it was simply the force of the right-hand fingers that gave either a heavier overdriven sound, or a lighter more delicate tone rather than any physical adjustment of the volume controls on either amp or steel.

I wanted to record a simple straight forward live track which showed the dynamic ability, rawness and live performance capability of the instrument in a soul-jazz setting. Whilst I borrowed heavily from the sacred steel techniques, *Weasil* still has a progressive Jazz quality and does not sound out of place with contemporary recordings in this genre. Again, the ability of three instruments to blend so well is proof that lap steel and the classic organ trio are compatible bedfellows and with consideration, other material from the soul-jazz genre can undoubtedly be arranged. Artists such as Eddie Harris, Ramsey Lewis, Gene Harris and even stretching further to encompass the more experimental approaches adopted by musicians and bands such as Weather Report and Miles Davis later period all have compositions that could be readily adapted for a lap steel organ trio; in particular, Eddie Harris's approach is of interest as he used simple phrasing and repetition combined with a gathering intensity which is perfectly adaptable to the lap steel. I could also envisage the

[45] Appendix 1 *Weasil* trill notation

instrument engaging with more contemporary styles played by jazz musicians such as John Schofield and Medeski, Martin and Wood whose groove and soul-based playing is used in conjunction with an almost avant-garde free approach creating incredibly engaging textures and phrasing. The ensemble size can of course, be increased with the instrument featuring with a large Jazz Orchestra, as featured in the film clip of Roosevelt Collier with the Dutch Metropole Orkestra. The ability of slide instruments to mimic vocal techniques could also open new possibilities of adaptation and arrangement, with direct influences from singers such as Sarah Vaughan who frequently used phrasings which incorporated slurred notes and vocal slide techniques. This 'vocalised' influence would feature certain techniques from the sacred steel approach concerning bar control and vibrato, but when used with restraint it opens possibilities for the instrument to explore an expansive vocal repertoire.

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Here We Are. (accessed 16/11/20) https://youtu.be/PIzFqdS5MXA

Jerry Douglas interview from 2019. (accessed 18/11/20) https://youtu.be/exfCjd8O3RM

transatlantic sessions project (accessed 18/11/20) https://youtu.be/q2jA2eDUlVI

Christine Bougie (accessed 12/10/20) http://www.christinebougie.com

Do I Ramble? (accessed 12/10/20) https://youtu.be/sDwih-dvK8s

Think from the End. (accessed 12/10/20) https://youtu.be/bzYTK_qWmj4

Me Her. (accessed 12/10/20) https://youtu.be/EXE2P6hAJhU

Equipment overview https://youtu.be/WZiz9iKnOyE

Techniques

G6 tuning https://youtu.be/uFOfRAppAFQ

Sacred Steel Vibrato. https://youtu.be/oQcN2FXyeeI

Greg Leisz influenced vibrato. https://youtu.be/nnr5RZbHEYo

Vibrato change, Leisz to Sacred Steel. https://youtu.be/q_C11q4Ze-s

Harmonic on a single string. https://youtu.be/fJD1tQgoO1Y

Plucked harmonic, slid with added reverb effect. https://youtu.be/megd7mg0K5c

Multi-string harmonics. https://youtu.be/JG9yRoqH2vs

Note regeneration. https://youtu.be/6gucejAkPN8

Alternate methods for note regeneration. https://youtu.be/Es_CjQ_IoBk

David Gilmour, Pink Floyd 1971. https://youtu.be/hSsjxbRxgqY

Dynamics and the overdrive effect. https://youtu.be/2jYPUQLzNyQ

Fulltone Fulldrive 2 https://www.fulltone.com/products/full-drive2-mosfet

Left hand bar trills. https://youtu.be/T4Sj-qMbE-0

Right hand trills. https://youtu.be/bW1Pgrtw24s

Luke Clebsch. https://youtu.be/WIAhX_Kfp2E.

Replicating guitar string bending techniques. https://youtu.be/BKW5iRQQf-E

Bar slants. https://youtu.be/7XYY41-C95w

Bar slants and pedal steel simulation. https://youtu.be/8JAoeeU9QA0

Wah-wah. https://youtu.be/v8loYPYAP7s

Buddy Merrill on a Fender four-neck console steel guitar (accessed 14/10/21) https://youtu.be/xcipRLzk4zM

Echoplex/Delay. https://youtu.be/fLYfzYnMaCM

Echoplex delay with volume pedal. https://youtu.be/pRStYGnRNyo

Changing tone with the right hand. https://youtu.be/bFNfRmgWC4Q

Nancy Sinatra's 1966 recording of *Bang.* (accessed 4/01/21) https://youtu.be/BkKDSFYvxKU.

B J Cole, *Gnossiennes Number Three* (accessed 10/09/20) https://youtu.be/57l7rl1qLXE

The Sidewinder by Lee Morgan (accessed 21/08/20) https://youtu.be/jAncCc1uhfI

Donald Byrd *Weasil.* (accessed 17/09/19) https://youtu.be/P_FeSOb-z8Q

George Benson (accessed 17/09/19) https://youtu.be/ilMWCMu4Szc

(accessed 03/01/21) https://www.larkinpoe.com/

Larkin Poe, *Holy Ghost Fire*. (accessed 03/01/21) https://youtu.be/e5-NxtiP0_k

Steve Cunningham (accessed 26/10/20) Well You Needn't-Thelonious Monk/Oahu Diana Lap Steel

Appendix 1 (Dropbox files)

Recordings:

https://www.dropbox.com/sh/us95ofq34gqfjql/AAC6cR7BgTEXBY5msVJQsAjNa?dl=0

1) *Mata Hari Part 1*

2) *Mata Hari Part 2*

3) *The Star-Crossed Lovers*

4) *Mercy*

5) *Petite Ouverture a Danser*

6) *Weasil*

Scores:

https://www.dropbox.com/sh/zjwhw8jijnsn6wo/AABb3rcVlRwUMJmzJ98WaxKVa?dl=0

String score for *Mata Hari Part 2*.

Erik Satie solo piano arrangement of *Petite Ouverture a Danser*.

Chord arrangement of *Petite Ouverture a Danser*.

The Star-Crossed Lovers harmony arrangement for four lap steels.

Harmonized parts for *Mercy*.

Trill passage replicating a blues harmonica phrase from *Weasil*.

Slide harmonics, chordal and single note.