THE TWENTIETH CENTURY TROMBONE: EXPANSION OF TECHNIQUE

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A thesis submitted in fulfilment of the requirements of the Manchester Metropolitan University for the degree of Masters by Research

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Manchester Metropolitan University (MMU Cheshire)

2013

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Abstract

This work is a study of trombone techniques and how they have developed over the course of the twentieth century. The focal point of the study is the extension and expansion of the available performance vocabulary for trombone, using a series of case studies, scores and existing research. The expansion of techniques can be particularly identified by studying some of the most prominent performers and composers as well as the changing role of the trombone in the context of ensemble

performance and some of the most prominent works that changed the role of the trombone for its future use through to the twenty first century.

Included in this study is an overview of the change of the trombone due to the improvement of manufacture and addition of the larger bore and thumb valve and how these developments affected technique. The work of performers and composers Arthur Pryor, Tommy Dorsey, Luciano Berio, Christian Lindberg and Jan Sandstrom is looked at in more detail to establish their role in the development of trombone techniques. Important developments in technique in this study include the use of voice, mutes, theatricals, electronics, microtones and early twentieth century developments such as technical virtuosity and the singing style legato.

The Twentieth-Century Trombone:

Expansion of Technique

1. Introduction

This work is a study of trombone technique and how it has developed throughout the course of the twentieth century. The focal point of the study is the extension and expansion of the available performance vocabulary for trombone. Broadly speaking, although facilitated by improvements in design and manufacture during the nineteenth century, the development of techniques could mostly be described as dependent on the imagination and technique of practitioners and composers over the course of the twentieth century.

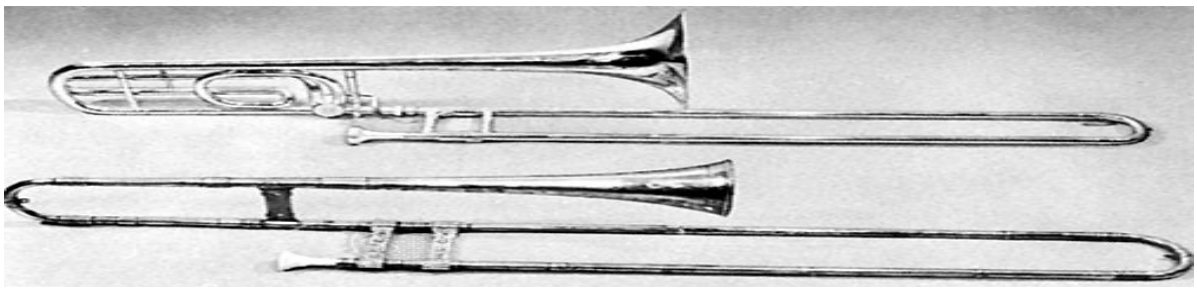
Previous research has covered areas such as the development of the trombone in jazz (Duncan Winfield), a study of contemporary techniques and their pedagogical execution (Benny Sluchin), a comprehensive description of trombone techniques (Stuart Dempster), the twentieth century soloist/composer partnership (Barrie Webb) and several studies into the trombone in a range of contexts (Trevor Herbert) including its history and its role in brass and wind bands.

This dissertation is a study of how and when the trombone techniques developed concentrating on the contribution from some of the most prominent artists and composers, the development of contemporary trombone solos including that with electronics, the changing role of the trombone in the context of ensemble performance and some of the most prominent factors that changed the role of the trombone for its future use through to the twenty first century.

2. **Instrumental Developments**

2a. The Early Trombone

The trombone can be dated back as far as the 15th century and was known from the 15th to 18th century by various names, most commonly the *Sackbut* but also as the *Sagbut, Shakbush, Shagbolt* or *Shagbut*. In Italy it was always known as the *trombone*, a word meaning 'big trumpet'. In time other names were eventually dropped for it to become known in most countries as the *trombone* (with the exception of Germany where it is known as *Posaune*). The physical form can be clearly seen to have changed very little in comparison to the trombone we see today. The main changes are the enlarged diameter of the bell flare and improvements in manufacture (Keith). Illustration 1. shows an example of a typical early trombone.



Illustraton 1

Sackbut by Jörg Neuschel, Nürnberg, 1557, in the Anthony Baines Collection (Anthony Baines)

2b. The Modern Trombone

Illustration 2 is an example of the trombone at the turn of the nineteenth/twentieth century. It can clearly be seen that the trombone pictured closely resembles the sackbut in Illustration 1.

Illustration 2

The tenor trombone of Arthur Pryor made in 1894 by Jake Burkle of C.G.Conn,

Dillons Music, USA (www.dillonmusic.com)

A typical tenor trombone at the turn of the twenty first century is pictured in illustration 3, again it can be clearly seen that the instrument although manufactured with improved materials, it closely resembles the sackbut in illustration 1 and retains the narrow bore. Illustration 4 also shows a trombone at the turn of the twenty first century but an open wrap thumb valve design showing the progression of valve technology and the standardisation of the thumb valve:

Illustration 3

The Vincent Bach 42 model manufactured by Conn-Selmer (www.conn-selmer.com)

Illustration 4

The Conn 88HO open wrap model manufactured by Conn-Selmer (www.conn-selmer.com)

As demonstrated in illustrations 1-4 there has been little development with regards the model and practical use of the trombone itself since its initial appearance, especially in comparison to other brass instruments that are more mechanically

dependent on valve technology and have relied on the progression of valve design. However there have been manufacturing developments this century which have increased the potential of instrumental technique for example agility of the slide. Wider sections known as *stockings* were introduced to the lowest section of the inner slide during the 19th century, lessening the friction between the inner and outer slides. This was further improved with the introduction of lubricants to improve slide action in the early twentieth century thus increasing the speed that the trombonist can manoeuvre between slide positions resulting in greater potential for technical virtuosity. Manufacturing materials were improved and a water key to facilitate the fast release of water; previously players had needed to remove the outer slide to tip out accumulated condensation. Inventions from the 19th century had improved condensation problems but the water release key (inventor unknown) has been retained to this day (Herbert, 2006).

2c. The Valve

The invention by Sattler in 1839 of the thumb operated valve located in the bell joint for the bass trombone increased the available range (Anthony Baines, 1976; Gregory, 1973). In Germany it became commonplace in orchestras during the second half of the twentieth century for the first tenor trombone part to play on a Bb (straight, no valve) instrument [1] whilst the second and third played on Bb/F trombones (with a thumb valve). This practice was later followed in other places such as the USA and Europe. At the end of the twentieth century with the improvement of

1 The alto trombone was popular in some eighteenth century orchestral repertoire and the instrumentation during this period is believed to have commonly (although unproven) been alto, tenor, bass (Herbert, 2006).

the valve design it also became commonplace for first trombonists to also use a Bb/F valved instrument, the advantage of the valve is the increase in lower note range, adding an extra chromatic series of notes descending from C to Eb.

The valve trombone (illustration 5) was invented in the 1820s incorporating the use of three double piston valves instead of a slide and was made in alto, tenor and bass pitches. As it was much more compact in its formation than a slide trombone performers needed less space making it popular in with theatres and marching bands. During the nineteenth century the valve trombone became very popular in bands in areas such as Italy, Czechoslovakia, and in the Viennese orchestras. The valve trombone however had intonation problems and players had to constantly make adjustments, the slide trombone had an advantage in that adjustments were easier to make and taken for granted as part of instrumental technique. The valve trombone began to fall out of favour with orchestral musicians towards the end of the nineteenth century and many trombonists moved back to the slide trombone. The slide is an important characteristic of the trombone and its removal impacts on playing style and techniques. Without the slide techniques such as the glissando, a very important characteristic, are rendered difficult or even impossible. Despite these factors the valve trombone however found favour amongst jazz musicians in the early twentieth century and became the instrument of choice for some of the most accomplished jazz musicians in the 1920s such as Duke Ellington’s trombonist Juan Tizol. Although the valve trombone is still in existence, it is mainly used in jazz, swing and marching bands, often for practical reasons for example lack of performing space, and its popularity still does not match that of the slide trombone (Herbert, 2006; Online; A Baines et al.; Greening).

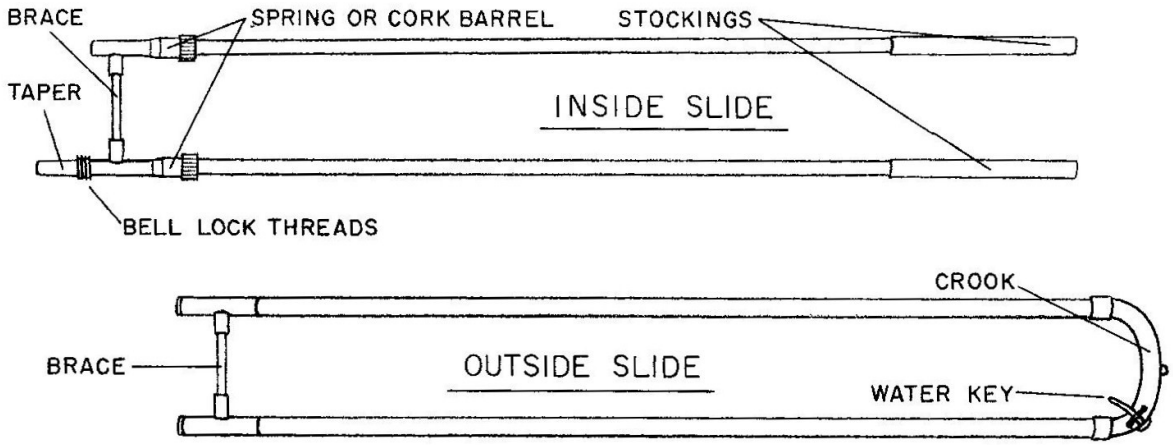


Figure 1. Trombone slide (Kleinhammer, 1963)

Illustration 5

Valve trombone by Getzen: Eterna 998 (www.getzen.com)

During the twentieth century the bore of the trombone was another area to experience change. Arnold Fromme writes in comparison with modern instruments

the sixteenth and seventeenth century trombones had a much smaller bore and bell affecting the volume and timbre which would be ‘softer and less resonant’(Fromme). Fromme adds that the tone quality would be sweet and clear but could also be described as slightly restricted and nasal. The mouthpiece was shaped like a funnel and also of smaller proportions than is common today but produced a mellow sound suitable for lyrical playing. The trombonists would have found the flexibility between registers limited and multiple articulations of softer sounding consonants, for example ‘r’, were learned to produce a sharper attack, consonants popular today such as ‘t’ or ‘d’ produce an unsympathetic and untidy sound on early instruments. Articulation throughout the twentieth century is discussed in the Articulation chapter. Although an extraordinarily large trombone was made in Leipzig after the 1830s, another of Sattler’s inventions and became popular in German military bands, the rest of Europe were not influenced by the idea of a trombone with a large bore until the second half of the twentieth century. However, large bore trombones became popular in the early twentieth century in the USA and a choice of bores became available by manufacturers C. G. Conn. From the 1940s large bore trombones were introduced into American orchestras and from the 1950s they were introduced into European orchestras. British brass bands made the change from high pitch A= 452.5 to low pitch A= 440 in the late 1960s and this brought them into line with the USA, this also meant that they could use the American trombones, including large bore, previously tuned at a different pitch. The brass bands in Britain introduced large bore trombones in the mid 1960s and they are still very popular in the British Brass Band today (Wilby, 2012; Miller, 2012).

3. **Early Twentieth Century Developments**

3a. Technical Virtuosity

It wasn't until the Twentieth Century that the trombone began to be recognised as a solo instrument in its own right and be featured in orchestral and chamber works. The seventeenth, eighteenth and nineteenth centuries included the trombone as an instrument that took an orchestral role but produced few solo works in comparison to the 20th century apart from isolated instances. the early 19th century saw the rise of the conservatoire educational system specialising in the formal training of musicians. Despite the lack of brass soloist positions available to graduates resulting in only a small number being successful in this career, all brass students were trained as potential soloists (Weiner et al., 2009; Webb, 2007). The highest ambition of the students was a military band career, considered a very prestigious role, with an orchestral career being a secondary aim. The pioneering Paris Conservatoire was founded in 1795 but it wasn't until 1840 that trombone classes were to commence, the rest of the world followed in the footsteps of the Paris Conservatoire soon after with the launch of studies in trombone.

Another important factor in development of technique was the introduction and wide distribution of instrumental method books. The most well known was the *Cornet Method* by Jean-Baptiste Arban (Arban, 1864). Despite being intended for a valved instrument, it was popular amongst trombonists seeking technical virtuosity (Herbert, 2006). Arban's Cornet Method is still popular today and a trombone method (mostly a transposed and edited version of the cornet method) was published for the Trombone (Arban, 1921) after Arban's death in 1889. Techniques explained in the method books were also later incorporated into other genres such as jazz; for

example the trill, nuance and other embellishments. Early twentieth century jazz trombonist Lawrence Brown was inspired by the melodic sounds of the cello and took on the formal conservatoire style himself, in spite of the popular New Orleans style at the time. Other jazz trombonists considered to be virtuoso included Miff Mole, Lou McGarrity and later Jack Teagarden and Tommy Dorsey, the latter two learned using valve instruments later transferred to the slide. The most high profile virtuoso trombonist of the early Twentieth Century is considered by many to be Arthur Pryor, a self taught vaudeville band musician who learned using the method book route - also originally on valved brass, later transferring to the slide trombone (Weiner et al., 2009).

3b. Performer: Arthur Pryor

Much of the technique development at the turn of the twentieth century centred around the USA with an increase in popularity of the travelling bands as well as the introduction of recordings. Arthur Pryor (1870-1942) was not a jazz musician as were the other trombonists mentioned above but a soloist in the Vaudeville and quasi military bands. He was best known for his association with the world famous Sousa Band, a band very popular with gramophone owners all around the world, an abundance of which owned Sousa Band records. Sousa is believed to be the most high profile musician around the time of 1915 having undertaken three world tours as well as several US tours. His principal soloists in the Sousa Band were virtuosos Herbert L Clarke (cornettist) and the aforementioned trombonist Arthur Pryor. Pryor's virtuosity was a display of acrobatic techniques and neat, technical precision despite the fact that he had worked out how to play the instrument himself without tuition. His

slide technique was criticized by many as many of the slide positions he used were considered by trombonists to be incorrect and his tone is said to have a ‘nanny goat’ habitual vibrato, possibly caused by a mule kick as a boy, which despite Pryor’s popularity as a soloist other players did not try to imitate (Wolfinbarger, 1983d; Herbert, 2006). As previously mentioned he learned on valves before the slide, having learned cornet and piano as a young boy before switching to the valve trombone at 11 and eventually slide trombone at 15. He is reported to have played in the region of 10,000 solos during the span of his career and been given the title “the Pagainini of the trombone”. Although other skilled trombonists were in existence for example Frank Holton and Henry Fillmore, Pryor could be considered representative of increasing technical virtuosity. He is considered by many to be the most outstanding trombone soloist of all time and was known to attract mass audiences thus introducing his virtuosity on the trombone to widespread area (Herbert, 2006; James & Raoul) (Wolfinbarger, 1983c).

Pryor contributed many of his own compositions around the late 1880s and 1890s, and produced over 300 works most of which were solos written specifically for himself to perform as there were limited trombone solo works available at the time. They also mainly consisted of simple songs, operatic airs and cornet solo transcriptions and were often not technically difficult enough to demonstrate Pryor’s abilities. Pryor’s compositions were written in order to specifically show off his own virtuoso technique and considered much more difficult than other solos that were available at the time. The recording sleeve written by Daniel E. Frizane (Author Pryor, 1997) states that Pryor was playing the instrument in a way that nobody had done before and had not been considered possible by other instrumentalists, music

had not been written at that time that could show off his ability, hence his own compositions (Arthur Pryor, 2002).

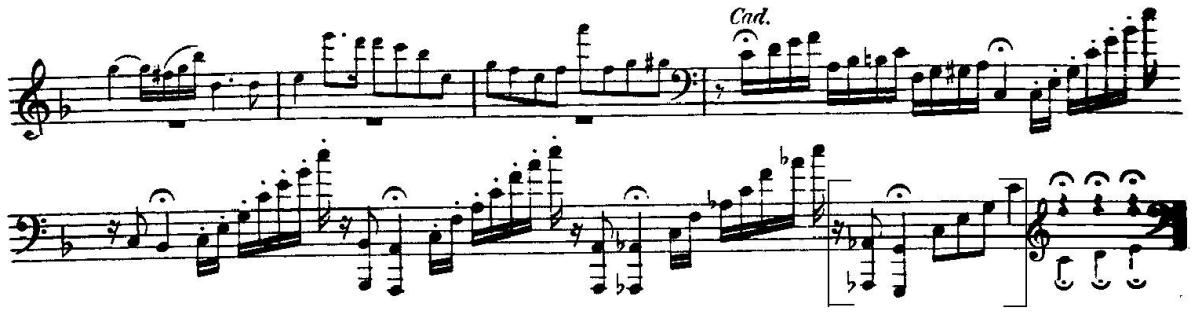
Herbert L Clarke, Sousa's cornet soloist wrote about Pryor's compositions and arrangements:

> ...most remarkable solos for technique and intervals in all registers, and which he always played faultlessly. I doubt if he ever missed a note at any concert, no slip of any kind, playing with the utmost ease. His compositions were so difficult that there was not a clarinet player, even that could master their technique on a clarinet. And we had the best in the world playing in the band. Pryor could play almost unbelievable passages on the slide trombone!
>
> H. Clarke (Wolfinbarger, 1983b)

Steve Wolfinbarger analysed some of Pryor's compositions in his journal articles *The Solo Trombone Music of Arthur Pryor* and wrote that the solos were similar in style to each other as he stuck to four main styles of composition; the Valse Caprice, Valse de Concert, Polka Caprice and Theme and Variations. Techniques included in some of these compositions include pitch ranges from two octaves *(Starlight, 1939)* to three and a half octaves *(The Little Chief, 1916 & The Blue Bells of Scotland, 1901).* Specific trombone techniques included in Pryor's solo compositions include the use of pedal notes, rapid slurred octaves, double tonguing – although Pryor was said to not use this technique himself and single tongue exceptionally fast instead - and of course legato melodic passages of the main theme.

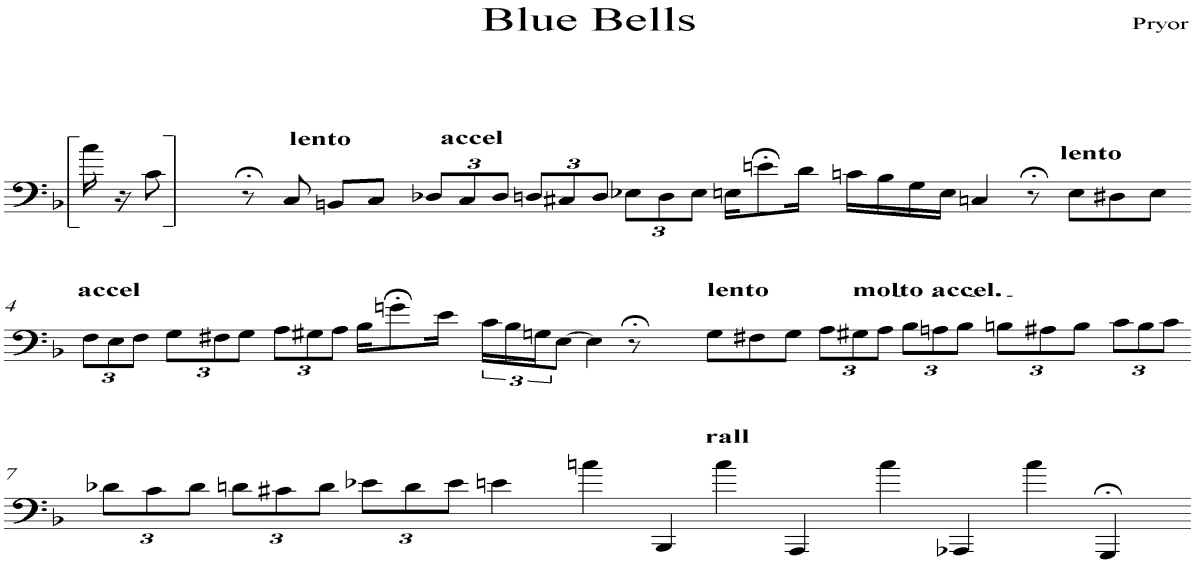
All Pryor's compositions included a cadenza which would give the soloist a self indulgent opportunity to show off their skills to the audience. Pryor was known to perform an extended and more flamboyant cadenza on stage even than the cadenzas he published in his solos. For example in his compositions *Thoughts of Love* (previously known as *Love Thoughts Waltz*) (1903) and *Blue Bells of Scotland*

(1901) the early Pryor recordings clearly present different and more difficult cadenzas (James & Raoul; Author Pryor, 1997; Weiner et al., 2009; Wolfinbarger, 1983b; Wolfinbarger, 1983d; Wolfinbarger, 1983a; Herbert, 2006; Smith, 1984). The recordings can be clearly heard to start each work at the main theme, missing out the introduction and initial short cadenza printed on the score in favour of a longer of a much longer and more impressive cadenza preceding the final variation. The original published cadenza published in *The Blue Bells of Scotland* (1901), taken from the score (Arthur Pryor, 2002) is shown below:



Example 1. Excerpt (cadenza) from *The Blue Bells of Scotland* (Arthur Pryor, 2002)

Pryor in the early recording *Arthur Pryor: Trombone Soloist of the Sousa Band* plays the pedal notes (lower notes) which are published as optional notes. The section in brackets (example 1) shows the section that is removed in favour of the longer cadenza (example 2) transcribed from the aforementioned recording in 1901 (Author Pryor, 1997) below:

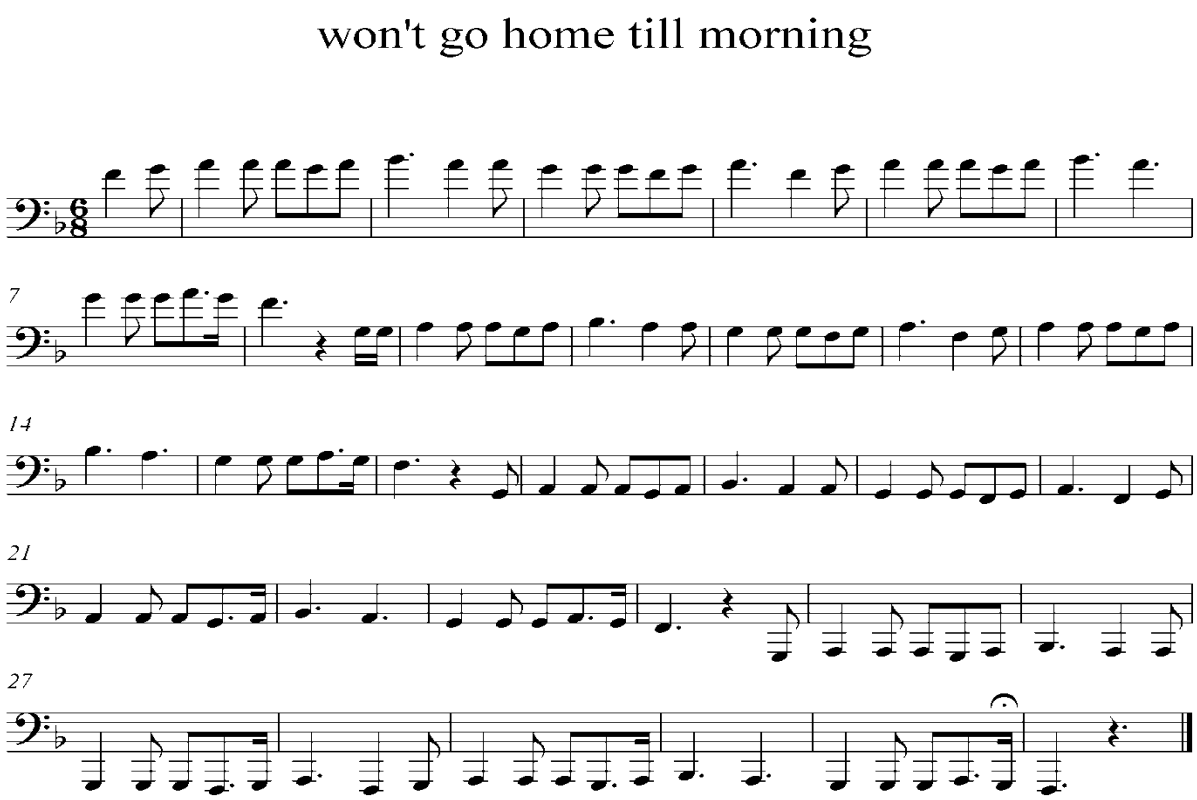


Example 2. Transcription by Kerry Baldwin from recording (Author Pryor, 1997)

The alternating pedal and upper register notes at the end are a simplified version of the published cadenza. The published cadenza uses arpeggios to link the low to high extremes with a preceding note a semitone above for each pedal. This would give the performer a 'run up' and therefore greater chance or of reaching the extremities unlike the cadenza Pryor played on his recording. To hit the extremities accurately without the linking notes would prove very difficult for most performers and Pryor can clearly be heard to play them with ease and without error.

Another recording on the reissued CD (Author Pryor, 1997) track 3 *We Won't Go Home Until Morning* (recorded 1901) it is verbally announced at the start of the track that Pryor will be playing this tune in no less than four octaves. Again this displays Pryor's virtuosity in that he had achieved a wide range and could comfortably play in both extremities of the trombone registers. At the time to play accurately and consistently well in all registers would have been considered technically a very difficult task, especially the pedal register on a small bore trombone. However,

despite the difficulties Pryor does play the tune in all 4 octaves as transcribed in example 3.



Example 3. Transcription by Kerry Baldwin (Arthur Pryor, 2002)

It is clear from the recording that Pryor plays this deliberately very slowly, despite the much quicker tempo given by the pianist in the introduction and repeated at the end. This may be due to lack of rehearsal as the pianist may not have known Pryor was planning to play it so slowly. I would conclude that he chose this speed so that the final and pedal register could be given the attention needed at that speed to make the notes clearly sound. He is clearly heard to be taking a breath for every note in the lower register which would not sound acceptable at a quicker tempo. The second note in bar 6 (example 3) is played A, lower than the preceding note, by Pryor. The same applies to the other octaves (bars 14, 22 & 30) although the pianist plays D,

higher than the preceding note in both piano sections. It is again likely that Pryor adjusted all the octaves in line with the pedal register as this note would only have been possible as a false tone at this time due to the lack of thumb valve. Another possibility is that Pryor could not reach the high D in the first and highest octave. However, I would consider this unlikely due to the same note being published in his own compositions *The Little Chief* (1916) and *La Petite Suzanne* (1937) (although the latter contains the high D as an optional note).

The Victor Phonograph Company employed Pryor as their musical director in 1903 after he had left the Sousa Band in 1902. Pryor's own band was formed in 1903 and recorded 2000 titles onto wax cylinder between 1903 and 1929 (Wolfinbarger, 1983a). Pryor's own recorded trombone solos included a vast number of his own compositions as well as by other composers, many of these have survived and have been digitally remastered onto CD catalogues, the most well known being *ARTHUR PRYOR: Trombone Soloist of the Sousa Band* (Author Pryor, 1997). In addition to his solo performances Pryor recorded many more tracks as conductor with his band. He also returned to make recordings as conductor with the Sousa Band, of which he had been previously occupied the role of assistant conductor from 1895-1902 (Herbert, 2006; James & Raoul).

Pryor's solos although light hearted in style showed little evidence of glissando, although he sometimes played unpublished glissandos in recordings. At the time the glissando was a popular technique with other composers who were writing music to accompany comedy acts such as circus entertainers. Trombonist Henry Fillmore was well known for this style of writing and his solos were very popular at the time (Herbert, 2006). In the introduction to Fillmore's *Lassus Trombone* no fewer than four glissandos are required and in the main theme no fewer than ten are required. It can

be observed when studying the published music of Fillmore that the glissando is commonly used in place of a traditional anacrusis when preceding themes and frequently in place of passing notes (Fillmore, 1978).

3c. Jazz Influences

The use of ‘tailgate’ was still in force especially in the jazz genre until the late 1920s and this role was difficult to progress away from. This was a characteristic of Dixie and New Orleans style jazz, the use of glissandos at cadence points along with providing connecting links between main themes. Bands frequently performed on wagons and due to the lack of space trombonists were placed at the rear with the slide sticking out of the back (Herbert, 2006; James Lincoln). In comparison to the trumpet which was respected as a solo jazz instrument, trombone technique was relatively undeveloped. Pioneer trombonists such as Higginbotham and Jimmy Harrison broke from this stereotype with their virtuoso solo styles involving ‘technical and expressive fluency’ (Schuller, 1989). Virtuoso trombonist Irving Milfred ‘Miff’ Mole was also important in advancing trombone technique, his recordings were said to have influenced many trombonists who followed in his style, such as Jack Teagarden, Tommy Dorsey and Glen Miller. At the time he was believed to be the first to have fully mastered the trombone as he could play with both a sweet tone and clear attack sound. James Henry ‘Jimmy’ Harrison, associated with the Fletcher Henderson Band helped to advance technique during the course of the 1920s with his ‘sonorous tone, bold ideas, and flexible technique’ he later became known as the ‘father of the swing trombone’ (John). This was followed by Jack Teagarden in the late 1920s with his interpretation of the blues, high register melodies that sounded

detached from the ground beat and his trademark lip trills (Martin & Waters, 2009; Online; Alyn et al.). Jazz trombonist Frank Rehak worked with John Cage to display the range of sounds that the trombone could produce before Cage composed *Solo for Sliding Trombone* as part of the *Concert for Piano and Orchestra* in 1957-58 (Webb, 2007).

Trevor Herbert explains in chapters contributed to the book *Early Twentieth-Century Brass Idioms : art, jazz, and other popular traditions* (Weiner et al., 2009) how the use and development of brass instruments in jazz and popular music became key to important developments in expansion of early twentieth century brass techniques across the genres. In particular the trombone took an important role in jazz. The rise in popularity of dance bands during this time saw an increased number of trombonists. Following this increase saw development of jazz technique (Lindsay). Jazz trombonists are stated to have been a major contributor in the pool of extended techniques (Gregory, 1973). The style of playing expressed a greater freedom and jazz techniques such as the singing style legato, agile slide technique, increased range, muting devices and styles adopted such as expression, tone and dynamics later found their way into the increasing pool of techniques used in art music. The influence of jazz techniques was a very important development and performers of art music who would not consider themselves to be jazz musicians could be found adopting the innovative techniques once used in jazz such as flutter tongue, lip and slide glissando, growls, slide vibrato and muted sounds. The techniques were absorbed into art music thus changing and redefining the overall brass playing idiom. Despite evidence of use of jazz techniques in art music earlier in the century they particularly became popular during the avant-garde period post World War 2. Extended techniques with jazz inspired origins became very popular with composers

at that time. However it was not only a one way development, techniques from art music such as formal scale patterns and arpeggio figurations, decorations such as trills and nuances were exploited into personal styles and infused into jazz technique (Weiner et al., 2009).

3d. Technique: Trends in Articulation

Articulation is important to the overall effect of music and on the trombone, and of course all other brass instruments, articulation is largely shaped by the tongue. The tongue produces a syllable consisting of a consonant followed by a vowel in most instances, the most popular sounds being ‘T’ or ‘D’. The tongue comes into contact with a certain point in the mouth to produce these syllables, depending on the individual this is usually somewhere between the roof of the mouth and the back of the teeth. The ‘T’ sound produces a seal with this point, briefly stopping of the air flow in the mouth and therefore a more pressurised amount of air is released causing a heavier attack. The ‘D’ sound produces a lesser seal and therefore a softer attack. Sometimes syllables such as ‘L’ are also used to reduce the attack further and create very smooth legato tongue (Seidel, 1984). The performer produces articulation, making a calculated decision as to what articulation is appropriate to the music performed.

Although articulation as a general technique is not new or specific to the twentieth century, some types of articulations were popularised or have been developed further since 1900, in particular those used in jazz or avant-garde styles.

Double tonguing creates a quick articulation where the single ‘D’ or ‘K’ would be too slow, the articulation T K - T K creates a crisp quick articulation. A more legato version would be D G - D G. Triple tonguing would then be articulated T T K – T T K or D D G – D D G. The single, double and triple tonguing articulations have been in use for a very long time, the double tonguing articulation which would apply to other brass instruments is documented in the sixteenth century by theorist and cornettist Girolamo Dalla Casa in his manual *Il vero modo di diminuir* in 1584 (Herbert, 2006).

The 1920s also saw rise to the popularity of the legato tongue which is explained in the *Singing Style Legato* section (3:b:ii).

During the 1940s a new popular style of articulation used in jazz developed and became known as doodle-tonguing. Its development was linked with trombonist J.J. Johnson, known for his light, focused and virtuosic performances. The syllables ‘da-dle’ or ‘doo-dle’ contain softer consonants than the double tonguing versions and work well with swing styles. The vowels used are to the preference of the performer, often using intuition to select which to vocalise and can be compared to scat singing (Bernotas, 1992; Herbert, 2006). The air in the upper register requires increased velocity to operate and the reduction of the oral cavity but it is vital that the tongue does not rise too high in the mouth and affect air flow (Seidel, 1984).

3e. Technique: Singing Style Legato

Denis Wick describes in his book Trombone Technique (Wick, 1984) the legato technique as being a continuous flow of air with as little interruption as possible. This means that the slide has to move between the notes with a very quick and precise

movement to ensure reaching the next note without breaking the sound. The legato tongue produces a smooth slur which almost merges the notes together. It is possible for the trombone to produce a very smooth legato line but it requires a great deal of control by the trombonist to achieve this (Kemp, 1975). Co-ordination of the slide together with the tongue, breath and embouchure when achieved can produce a clear legato. It is said that when a trombonist produces a legato with good technique, the sound is characteristically close to that of the singing human voice (Kleinhammer, 1963).

Although legato style was not unheard of before the 20th century and certainly not when performed on a valve trombone, the emphasis appeared to be placed on the technical ability of multiple notes. Earlier recordings of virtuoso trombonists such as Arthur Pryor show evidence of legato performance but little evidence of the singing style as will be described below in Dr Robert Lindsey's classification (3bii) indicating that it had yet to be developed until the 1920s.

3f. Performer: Tommy Dorsey

In 1920 the first commercial radio station began to broadcast in America and was quickly followed by many more stations. This saw in increase in popular songs and vocalists began to be main soloists. Although the lyrical theme of nostalgia had previously been the popular choice, this began to change to the topic of romantic love. Aided by the microphone the new style tended towards the slow melody, frequently with blues influence, and became of a more personal and intimate nature (Morris et al., 1984).

Dr Robert Lindsay in his article *Professional Music in the 1920's and The Rise of the Singing Trombone* writes about the development of a smooth legato present in recordings from 1928 by pioneers such as Tommy Dorsey (1905-1956), a former silent movie orchestral trombonist (Herbert, 2006; Lindsay). Trombonists only really started to develop sentimental ballad playing during the 1920s and Dorsey became well known for his particular interpretation and style (Online). Although other trombonists were using some of these techniques such as high register, legato and vibrato, Dorsey's blend of these plus the incredible lyricism in his ballads made him a very sought after and distinctive musician (Herbert, 2006). Lindsay provides a clear classification for the analysis of Dorsey's technique development:

1. Long Line. There is a seamless legato that runs many bars without a break. Also relevant is the cleanness of execution, with no sense of strain in these lines.
2. Upper Register. The comparable human voice is more tenor than baritone. It is also more counter-tenor than tenor, and more like a head tone than a chest tone. By today's standards, the range is not all that high, rarely moving above a D natural. But as others have observed, to stay up there all night long is very taxing indeed. It is still, in that sense, the upper register.
3. Soft Dynamic. The range is mostly piano to mezzo piano, and quite often softer at the top than it is further down. While this soft dynamic is part of the style itself, it is also made necessary by the long line and the high tessitura – thus making it a principal component technically as well as musically.
4. Unabashed Romanticism. This is a consequence of phrasing, but also is reflected in the use of what might be called a falling dynamic: a diminuendo at the climaxes. The result is a certain sense of vulnerability. Again the pianos and the mezzo pianos are part of the essence.
5. Tone. The sound is one of great beauty, itself a singing thing. But also important here is a characteristic pointed out by Lawrence Brown, the great trombonist of the Ellington band:

> I think Tommy Dorsey was the best tone man I have ever heard. He could keep his tone so thin, keen and cutting. I don't have. I have "oo" but not the "ee", and in all the recording you get that baritone sound.
>
> Lawrence Brown, quoted in *The World of Duke Ellington* (Dance, 1970)

Professional Music in the 1920's and the Rise of the Singing Trombone (Lindsay)

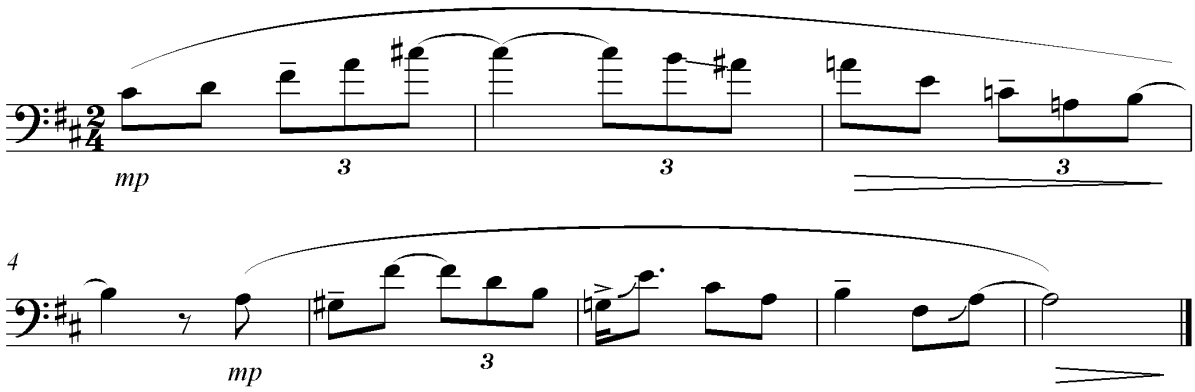
I have listed the main features in these points into table form for quick reference when analysing Dorsey's style:

Technique	Range	Particular Points of Interest
1. **Long Line**	All Ranges	Seamless legato Many bars without a break/breath Cleanness of Execution, no sense of strain
2. **Upper register**	Upper register - extended	Comparable to vocal head tone Requires great stamina
3. **Soft dynamic**	Upper register	Piano – mezzo piano range The higher the note, the softer the dynamic
4. **Unabashed Romanticism**	All ranges	Clever use of phrasing Falling dynamic – diminuendo at the climaxes Sense of vulnerability
5. **Tone**	All ranges	Singing tone Thin, keen and cutting

Tommy Dorsey's recordings from *circa* 1928 can be described as developing this recognisable legato sound but still not completely established as the fully developed technique as described by Lindsay. The phrases were also shorter. For example *Mary Ann* (1928) and *Evening Star* (1928) use a sweet legato but phrases are eight bars long in both pieces unlike the unusually long phrases recorded much later. By 1937 his recordings clearly show the more mature 'singing style' sound with phrases of considerable length. In a recording of *Who?* (1937) Dorsey's phrases vary in length but 12 or 15 bar phrases are heard without breaths where would be expected making a very effective interpretation. Less air is required when playing in the upper register and Dorsey played into a microphone on stage thus lessening the dynamic he was required to play it and optimising the use of his breath capacity, however it was not uncommon for Dorsey to play phrases as long as 16 bars for example 'Song of India' (1937) (Cosgrove, 2007). In the 1932 recording of *Who Stole the Lock* Dorsey played a lip trill for a full 8 bars, another technique was single note reiteration, both were innovative at the time. It was common by 1935 for Dorsey's ballads to commence with the trombone playing a lyrical main theme before the vocalist then coming in afterwards (Schuller, 1989).

The development of the legato style can clearly be heard in two different recordings of *I'm Getting Sentimental Over You* dated 1932 and 1935. This became Dorsey's theme song and was written by George Bassman (Schuller, 1989). The two recordings were made three years apart and it is clear from the transcriptions (examples 5 and 6) just how much the styles have changed and developed in this short time alone. In the earlier recording dated 1932 (example 5) the notes, although played in a traditional legato style, are not merged together as smoothly as in the later recording. Dorsey is heard to use portamento, described as small glissandos or

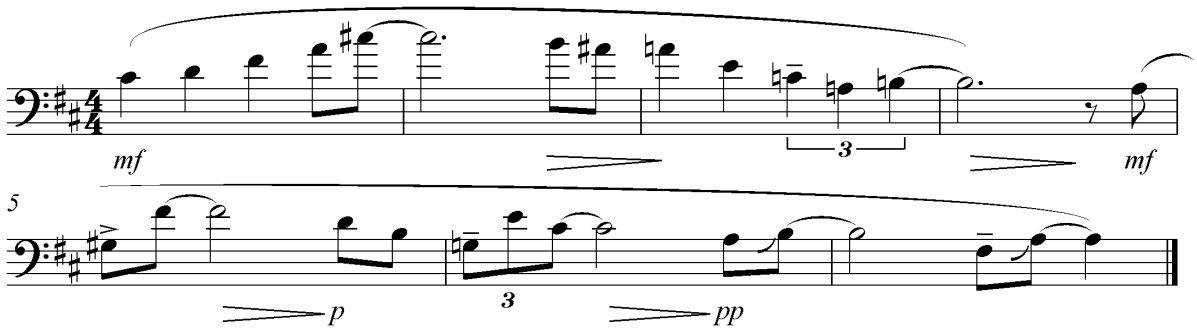
slides when moving from note to note such. This is heard between the triplets B and A# in bar 2 and small scoops leading up to E in bar 6 and A in bar 7 rather than cleanly moving between them as is specified in Lindsays's article in point number 1. Points 3 (soft dynamic) the drop of dynamic when entering the higher register is not heard in this recording, dynamics either stay the same or rise with the shape of the music. Point 4 mentioning the diminuendo at phrase climax is also not heard, the dynamic is constant through the phrase climax in bar 2 and does not drop until the end of the phrase in bar 3. The second phrase is very similar in dynamic formation as the first. The moderate tempo and accompanying chords give a duple time swing feel to the music making it feel quite light and simple unlike the later recording which has a more ballad-like style.



Example 5. Excerpt from *I'm Getting Sentimental Over You* by George Bassman (Dorsey 1932)

Transcription Kerry Baldwin

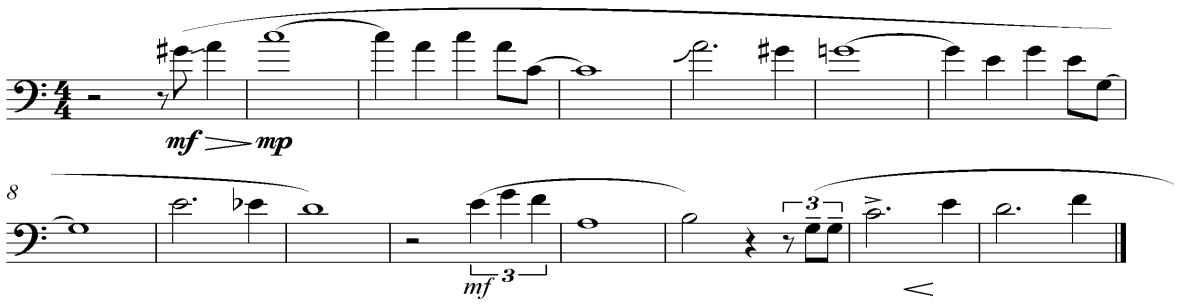
The recording from 1935 (example 6, below) contains more of Lindsay's points: for example, point 1 (long line) the very smooth flow of notes are executed in a way that you can hear little movement or portamentos between them, they move from one to the next with a technique more associated with the movement of keys/valves rather than a slide. The portamentos between notes have been lost in favour of a clean movement but he retains the scoop in bar 7 as previously heard in the 1932 recording. Portamento was very fashionable at this time and was often associated with crooners, this became less so over time in favour of a cleaner movement between notes (Ellen) The second, later, recording (example 6) shows little evidence of portmento. Points 3 (soft dynamic) and 4 (unabashed romanticism); the dynamic can be heard to drop in the middle of the phrase in bar 2 rather than at the end as the pitch falls, not as it rises as in Lindsays's article. The second phrase starts louder but gets progressively softer throughout the length, ending very quietly. The overall dynamic is much softer for the 'intimate' sound which was popular at the time. The overall tempo is slower than the 1932 recording (example 5) and has a longer quadruple feel to the bars, this was more in place with the description of ballad singing by the vocal crooners (as explained at the start of the *Tommy Dorsey* section) which were at the peak of popularity during 1930/31 (Schuller, 1989). The vibrato sounds quicker and with a shorter length of slide used. Charles H. Cosgrove (2007) describes Dorsey's phrasing as 'The seamless movement across syntactic breaks and cadences' (Cosgrove, 2007).



Example 6. Excerpt from *I'm Getting Sentimental Over You* by George Bassman (Dorsey 1935)

Transcription Kerry Baldwin

Although there would at first appear to be little difference between the two, when listening to them there is a distinct difference as the 'singing style' legato stands out to the listener and is very distinctively heard to be Dorsey. In a later recording in 1937 of *Marie* (example 7) the technique is again developed further:



Example 7. Excerpt from *Marie* (Dorsey, 1937).

Transcription Kerry Baldwin

The unbroken phrases are still longer than the earlier recordings from 1932 and 1935 as mentioned in Lindsay's point 1; (long line) nine bars in the first phrase as opposed to four in the previous excerpts, these are done in one continuous breath. The range stays higher and is very soft as mentioned in Lindsay's article point 2 (upper register) and there is a distinctive drop in dynamic during the first three notes rising to C as mentioned in point 3 (soft dynamic).

The vibrato Dorsey uses is slide vibrato; this is more popular than other styles such as lip vibrato amongst jazz trombonists especially when playing songs and ballads (Lusher, 1985). The slide is moved up and down rapidly thus changing the pitch of the note back and forth (Dempster, 1979). Dorsey can be clearly seen on film to be using a very fast slide legato using a very small pitch range (Green, 1947). He used this style of vibrato throughout the entire length of long notes rather than starting without and gradually increasing the movement throughout. This would certainly have contributed toward his distinctive singing sound.

Dorsey's legato technique has been named by many trombonists to have been the master of romantic and lyrical technique using his breath control, clean slide work and articulation (Schuller, 1989; Kleinhammer, 1963) and to have had a great deal of influence on their own styles of playing (Lindsay). Kleinhammer and Wick each claim in their pedagogical techniques books that the legato style trombone technique is the nearest sound to the human voice (Kleinhammer, 1963; Wick, 1984). Dorsey's style influenced singers as well as other instrumentalists. For example, Frank Sinatra freely admitted that Dorsey was an influence in his own musical style. Sinatra was fascinated by Dorsey's effortless style of phrasing, musical line and breathing. He observed these techniques and used them in his own performances (Simon, 1965):

> “Even without lyrics Tommy made it sound so musical that you never lost the thread of the message.”
>
> Frank Sinatra (Simon, 1965).

3g. Technique: Filtering Devices (Mutes)

The development of muting/filtering devices has increased considerably over the course of the century. Early mutes were used in secret military retreats as well as funeral ceremonies. Mutes alter the timbre as well as the volume and give an extra palette of sounds available to the composer and instrumentalist. However muting devices interfered with the intonation of the instrument. Seventeenth and eighteenth century mutes reputedly raised the pitch by as much as a tone, surviving early mutes could raise the pitch as much as a semitone, the use of an extra length tubing referred to as a crook the pitch could be returned to its original state. These have been developed and refined over the years to reduce this considerably (D. B. David et al.)

In *The Trombone* (2006) Trevor Herbert lists works using mutes such as by composers Dietrich Buxtehude in the 17th century, Berlioz, Wagner and Rimsky-Korsakov in the 19th century. However jazz musicians in the early twentieth century significantly increased the use of muting, the range of mutes producing individual characteristic sounds and developed the techniques associated with it (Herbert, 2006). Tyree Glenn was known to use a plunger mute to create vibrato, moving it quickly back and to over the bell of the trombone. King Oliver from the Creole Jazz Band is believed to have been one of the first to use a variety of mutes evidenced by recordings made in 1923 although this is believed to be some time after he first

started to use the collection. There are many recordings of the soloists in this band using a variety of mutes including straight, plunger, what was later to be named the *harmon* and cup at around this same time (D. B. David et al.; Bernotas).

Below are some descriptions of specific muting devices:

1. Straight Mute: The straight mute is the most commonly used mute, it is usually conical or pear shaped with a closed end and can be made from a variety of different materials although the most popular are wood, metal or fibre, sometimes lined with stone. The mute is placed into the bell of the trombone and secured with cork strips that leave an opening for air to get past out of the bell as well as into the mute. The cork strips can be filed to give the desired intonation and effect. The timbre of the instrument is altered but pure and direct when combined with breath pressure, when played at a loud dynamic the straight mute can rattle, an effect desirable to some composers.

2. Cup Mute: The cup mute is utilised in the same way as the straight mute in that it is held in the bell of the trombone by cork and is a similar design. However the cup mute has an extra felt lined section at the end of the mute that protrudes and covers most of the bell of the trombone. The cup section is often adjustable so that it can be moved closer or further from the bell thus lessening/maximising the effect. The mute is said to remove the edge from the sound or to give a more ‘rounded’ effect.

3. Plunger Mute: The plunger mute is a hand held device used to manually cover/uncover the bell of the trombone. The trombonist uses the left hand, the hand that would usually be supporting the trombone, to operate the mute. The mute is held in the palm of the hand and manipulated between the open and

closed positions. The right hand operates the slide as normal. Originally a rubber sink plunger would have been used and is still sometimes used today hence the name. Rubber specially made plunger mutes are still commonly used and are gentle on the bell of the instrument, however metal, plastic and wood are also used. Closing the mute fully onto the bell can interfere with intonation hence most players consider the instruction of *closed* to be mostly closed, however if fully closed is what the composer wants it frequently has its own specific symbol (below). The plunger mute can be skilfully deployed to imitate vocal sounds and can be teamed with a straight mute. Chris Kelly was the first brass musician on record to use a plunger instead of his hand to create the desired effect on his cornet.

4. Harmon Mute: The Harmon mute is usually made from metal and held in place of the bell of the trombone with a cork ring that seals the air passage completely, sending all the air flow into the mute. An adjustable length of tube with a small cup on the end protrudes from the centre of the mute which can be played part or fully extended, with the tube fully retracted, or removed all together. The harmon mute can be utilised simply with one of those choices or futher operated manually by covering/uncovering the protruding cup with the performers hand in a similar way to the plunger mute. Although it is claimed that the mute originated in New York and was patented by John F. Stratton in 1865 its first recorded use under the now widely known name of Harmon was in 1924 in Gershwin's *Rhapsody in Blue*. The Harmon mute was made by T. Harmon and is also known as the wa-wa mute, it was the result of twentieth century research by jazz musicians.

5. Bucket: The bucket mute is attached onto the bell of the trombone using sprung clips so that it is at a set position. It is filled with materials designed to absorb the sound giving a softening or ‘deadening’ sound. Another similar mute is the Derby or Hat, this gives the same kind of effect as the bucket. It was particularly popular in the 1920s and 1930s and was usually in a fixed position so that the trombonist could move forward and play into it. The hat was used in *Stravinsky’s Ebony Concerto* in 1945.

6. Whisper mute: The whisper mute is specifically designed to give a quiet sound, hence the name. Loud dynamics are generally limited with this mute and it gives a distant sound as if the trombone is being played far away. The whisper mute features in Morton Subotnik’s composition for trombone *The Wild Beasts* (1979)

   (Kleinhammer, 1963; D. B. David et al.; Sluchin, 1995)

As to mute choices different manufacturers use different materials which can produce differences in timbre. Although it is mostly down to the player’s discretion unless specified in a score, most sections use a matching set to give some sense of uniformity. The composer also needs to give the performer enough time to position the mute.

Notation for most mutes consists of a simple mute/con sord or mute out/senza sord instruction, along with specific instructions in some cases as to what kind. Without specification a straight mute is normally deployed. However manually operated mutes such as the plunger or Harmon require further instruction as to where the composer wishes them to be open/closed/partially closed. Composers such as Berio

used a separate line below the main stave for plunger mute instructions (see examples 7, 8 & 9) (Herbert, 2006; Sluchin, 1995; D. B. David et al.).

The plunger mute became very popular in jazz and this tradition has continued throughout the century. It is often used to imitate the human voice during a solo. Musicians choose to use the plunger mute with or without a straight mute, the choice is down to the individual. The combination does however cause a lot of back pressure to force the air through the trombone and causes lip pressure too. The straight mute needs to be short and not protrude excessively from the bell of the trombone as this could affect the operation of the plunger mute. For this reason a trumpet mute is sometimes used as it is much smaller than a trombone and disappears into the bell of the trombone without affecting the plunger mute. Extra cork has to be added around the sides of the mute to ensure easy removal. Some trombonists use a *pixie mute* by Hulmes and Berg. Another popular trumpet straight mute is the *non-pareil* made by Magosy and Buscher as used by Duke Ellington's trombonist Sam Nanton otherwise known as 'Tricky Sam' (1904-1946), he was known for his 'growl and plunger' technique. This became an important sound in the 1930s characteristic of the Ellington era. As this particular mute is no longer manufactured and hasn't been since the 1950s it has become a sought after mute. Similar models are now manufactured by companies such as Tom Crown Mutes who have made a copy of this mute and named it the *non-magosy nonpareil*, the materials are slightly different so there is a small change in sound but it is similar enough to be acceptable to most trombonists.

Syllables described as "wah", "yah", hi" "yee" "a" "kaw" can be made using combinations of plunger mute manipulation along with articulations on the trombone imitating the phrasing and articulations and even the laughter of the human voice.

Despite its popularity at this time, previous works had been composed mimicking human laughter. For example, in *Hyperprism* (1924) by Edgar Varese the trombone part shows instructions to mimic laughter with the use of a mute and a glissando (Dempster, 1979; Herbert, 2006; Bernotas; Online; Varèse, 1924).

The ability of the plunger mute to imitate, manipulate or vocalise other sounds has increased in popularity over the century in the field of avant-garde music, it is seen less often in a traditional orchestral or brass band setting. It featured heavily throughout Berio's *Sequenza V* (1960) which is further explained in the *Berio* section (4:c). Likewise the plunger mute features in *Camel Music* by Howard Buss (1976) to represent animal sounds, specifically camels, by manoeuvring the plunger in an open to closed position at a fortissimo dynamic (Vivona, 1982). Jan Sandstrom's *Trombone Concerto/Motorbike Concerto* (1986) features the plunger mute along with the flutter tongue to manipulate the sound to represent a motorbike. This work is further explained in the Sandstrom section (4:g). The use of the plunger to create laughter has also been used in a theatrical sense and features in *Chamber Music III* (1980) by Robert Suderburg. The same technique represents the sound of laughter in the third movement titled "Brother Devil" combined with actual imitative laughter from the pianist (Dempster, 1979).

4. **Later Twentieth Century Developments:**

The second half of the Twentieth Century saw a change in direction as to the repertoire and performance practices of the trombone as are explained in the following chapters. With the increase of new technology along with composers and performers pushing the limits of the trombone, new possibilities occurred to increase

the voice of the trombone. Trombonists such as Paul Rutherford (1940-2007) who had an interest in free jazz and improvisation, Vinko Globokar (1934-) and Stuart Dempster (1936-), both of whom were interested in developing new techniques to produce different sounds, were all helping to expand the voice of the trombone.

4a. Theatrical Techniques

Although musical presentation in itself could be regarded as theatrical in the manner that musicians presents themselves to an audience, theatrical techniques in addition to general musical presentation have developed tremendously over the course of the century. Of course, theatre is clearly evident in musical acts such as opera, a grand stage production in which music plays an important role. However, changes in the area of theatre changed direction over the course of the twentieth century. From early in the century during the Jazz and Vaudeville performance era, theatricality were popular but were typically initiated by the performer not the composer. The trombone was frequently used as a comedy act (Vivona, 1982).

Stuart Dempster writes:

> The theatrical trombone probably goes back no further than New Orleans jazz, minstrel shows, and/or vaudeville. Theater techniques are not really a part of New Orleans jazz except that the 'tailgaters' of the early 1900s literally had to play over the tailgate of the wagon in order to have room for the slide. Real theatrical consciousness for trombone players probably took hold in the New Orleans era, coming down via Vaudeville and the Spike Jones era, directly to contemporary music.
>
> Few other instruments can approach the theatrical implications of the trombone: even when it is played normally, the slide moves at least 3 inches for only a half-step. Musical sight-sound relationship is probably nowhere more obvious than in the trombone glissando; everyone knows this visual

> cliché. When an instrument must extend the throat as well as the arm the trombone is a much more logical 'body extender' than other instruments which resonate sounds of the body, having a completely variable resonator length. This has implications both acoustically and visually.
>
> Stuart Dempster. Quoted in:
>
> *Theater Techniques in Recent Music for Trombone* (Vivona, 1982)

From 1960 the use of theatre in trombone music began to develop into a new era with the introduction of music with a visual element, with the inclusion of stage instructions. Just prior to this *Solo for Sliding Trombone* was written by John Cage in 1958. Although the work does not give specific theatrical instructions in addition to the music, it could be considered that the visual nature of the piece gives it a natural theatrical element. The work includes disassembly and reassembly of the instrument in many different ways as well as the use of silence, muting and props such as jars (Cage, 1960). Developing this idea further in 1962 a quartet was composed and premiered by Jan Bark and Folke Rabe named *Bolos.* This was a request by Swedish Broadcasting Corporation to display unconventional trombone techniques. The work, as in the John Cage work, included the disassembly and reassembly of the trombone but as a quartet also featured interaction between the performers. Rabe explains on his website that the techniques featuring in Bolos were 'picked out of their jazz tradition environment and used in a graphic score' (Rabe; Vivona, 1982; Dempster, 1979).

A ballet, *Anagnorisis*, by Robert Hughes was written in 1964 for trombonist Stuart Dempster featuring trombone, solo dancer and percussion featuring a garden hose solo again naturally including a strong visual element. This was followed by Pauline Oliveros and Elizabeth Harris *Theater Piece for Trombone Player and Tape* in 1965, a work that featured trombone player (without actual trombone) with garden hoses,

funnels attached to trombone mouthpieces, candles that flicker from the breath flow produced and various other props (Dempster, 1979; Oliveros & Harris, 1965).

For subsequent developments in trombone repertoire the outstanding work in this period was of Luciano Berio's *Sequenza V* in 1966. This composition developed the use of theatre, technique and sound palette giving specific instructions as to the actions of the performer, the dress code and the stage presentation. This work is explained further in the Berio section (4:c). The Oliveros/Harris work (1965) previously mentioned further inspired Dempster to create his own theatrical work; a mixed media ballet entitled *Ten Grand Hosery* (1972) featuring multiple garden hoses as well as other specified stage props, instruments, specific lighting and stage instructions (Dempster, 1979).

In addition to Berio's Sequenza V (1966) there are other works which include the use of costume and theatrical gesture, these include *B.P., A Melodrama* by Lawrence Moss (1976) which features trombonist, pianist and several other performers representing characters in the Greek Legend of Baucis and Philemon (hence the title initials B.P). Moss also uses multiple trombone mute sounds to represent different character disguises of the trombonist (Vivona, 1982; Moss, 2012).

Theatrical elements appear featured in less of a central role in compositions such as *Basta!* by Swedish composer and trombonist Folke Rabe (1982). In this work the performer is instructed to run onto stage, perform, and then run off stage. Rabe explains on his website that he had the idea that the performer is acting as a messenger who rushes in to deliver his message. The content of such message, and in fact the meaning of the title (*Basta* is Italian for *Enough*) is left to the imagination of the performer/listener (Rabe, 2012)

Theatrical styles continued towards the end of the century with works such as Jan Sandstrom's *Motorbike Concerto* (1989). Although Christian Lindberg has been known to perform this work dressed in full motorbike leathers, it has not been included as an instruction in the score. However other instructions have been included on the solo part such as "map drawing", "suckscream" and "spin around" as discussed in the *Sandstrom* section (4:g).

Foot tapping is a simple inclusion which could be considered theatrical or percussive depending on the nature of the music and how much of a part the foot plays. In Bernstein's *Elegy for Mippy II* (1960) a constant steady tap on the beat is featured from start to finish without the use of any other theatrical elements, this could be considered a percussive element as part of the overall sound as opposed to a visual aid. Foot tapping was used in the later *D. E. Memorial* in 1975 by Werner Heider, a memorial to the late Duke Ellington. The feet play a more complex role in this work in that they are both used and with the inclusion of dynamic markings and ad lib. *Kokakoka* (1999) by Christian Lindberg followed from this with the inclusion of foot as an accompaniment role and voice, the foot is used in a rhythmic interjection between sections of notes, voice and multiphonics (Vivona, 1982; Publishing, 2012; Tarrodi, 2012).

4b. Technique: Trombone and Voice

A very prominent development in technique is the use of voice, this can be voice alone as a part of a trombone composition or the use of voice and instrument simultaneously, known as vocal multiphonics. It is believed to be more effective to perform vocal multiphonics on lower brass instruments than higher pitched

instruments as the timbre is better suited and the overtones series are rooted in the lower pitches. However, it is still possible on higher pitched instruments. The balance is achieved by making sure that the sung note is matched in volume to the played note as it is often too soft to make the chord ring out (a specific sweetness to the sound) and the multiphonic is less effective. An octave multiphonic can produce overtones such as a third above and a fourth below if enough air and balance is achieved (Bernotas, 1999). When two or more notes are created simultaneously – in the case of the trombone one sung and one played – the mind can perceive extra notes, especially if a typical chord is missing a vital note (Herbert, 2005). Another way this can happen is if the sung and hummed notes are an interval of a tenth apart, inner notes can be perceived however these will be weak (Read, 1976).

There are many sounds and effects that can be produced with the voice whilst playing the trombone, although these had been in existence from the late eighteenth century and were still used during the nineteenth century. For example Mantia (1873-1951), Frederick Innes (1854-1926) and Jean-Baptiste Arban (1825-1889) were all believed to have been able to perform vocal multiphonics. However, they only really became popular in the second half of the 20th century (Dempster, 1979).

Intervals can be performed using this technique and the voice can be added before, after or simultaneous to the instrumental note. The pitches of either can also be altered throughout the duration of the original note (Sluchin, 1995). Flutter tongue can be added to the mix of polyphony to give extra timbral effect (Read, 1976). To sing and play simultaneously is a technique requiring a lot of perseverance to control both the actions of the lips and vocal chords enough to move independently (Sluchin, 1995). The first note is produced on the instrument in the conventional way with the embouchure in a fixed position, the second note is produced in the throat of the

performer. When learning this technique it can take time and perseverance to master. An effective technique is to practice producing the played note first then once it is established then introducing the sung note, then vice versa. Once the player is used to this they will eventually be able to master the advanced technique of producing both notes at the same time (Herbert, 2005).

The vocal pitches in some compositions are not well suited to the range of the female voice so female performers are sometimes forced to find alternative solutions such as the vocal pitches being raised an octave higher than written (Sluchin, 1995) or reversing the notes of the chord; this can also be done for male performers if the vocal part is out of range. The chord remains as written however the timbre may sound different. The ideal range to write vocal parts in would be second tenor as most of the notes would be accessible by most vocal ranges (Dempster, 1979). John Kenny wrote *Secret House* (2001) for female trombonist Emily White as a piece for trombone and female voice. This was specifically as the pool of female trombonists has increased over the years and most existing contemporary trombone repertoire involving multiphonics is aimed at the male vocal range, making it less accessible to the female repertoire. Kenny wanted to produce the vocal multiphonic pitches and timbre uniquely available to the female trombonist. *Secret House* was premiered in 2001, it specifically uses the female vocal qualities available along with a female dancer although the full production also featured a second theatre piece including a male bass trombonist and two dancers (Kenny, 2003).

There are many trombone works that feature the use of trombone multiphonics. These include *Solo for Sliding Trombone* by John Cage (1958), *Sequenza V* by Luciano Berio (1966), *Basta* by Folke Rabe (1982), works by Jan Sandstrom

including the *Trombone Concerto No. 1/Motorbike Concerto* in 1989, *Camel Music* by Howard Buss (1976).

In 1958 John Cage wrote *Solo for Sliding Trombone* (published 1960), as part of the *Concert for Piano and Orchestra*, a work that explored the different sounds that could be made with a trombone. He introduced a range of sounds that could be produced on the trombone and included vocal techniques such as shouting, speaking or barking into the instrument but did not include singing specified pitches. At the time there were few works of this nature for the trombone and the work could be considered to be one of the first avant-garde works for trombone. Cage wrote it for Frank Rehak to perform, as he was a jazz trombonist, therefore accustomed to extended techniques, as well as classically trained he was considered the ideal performer to undertake this work (Dempster, 1979).

Luciano Berio explored the use of voice in *Sequenza V* (1966) for solo trombone: the opening 'theatrical' section slowly introduces the voice alone with use of a single sung note and by a note being produced whilst inhaling inwards. This is followed by pairs of sung notes using the 'u a' syllables in imitation of a plunger mute. The 'B' section of the piece explores further the sounds produced by singing at the same time as playing the trombone. Frequently the performer sings the same note as the instrument plays and then changes one of the sounds, moving them apart from each other (fig 1). The same technique is also used later in the 10th system to produce the sounds of different intervals between voice and instrument (fig 2). Syllables are specified to imitate the sound of a plunger mute in the 11th system (fig 3) and to distort the notes in the 10th system using vocal sounds '*u-a-i'* (fig 4). In the 7th system the voice and instrument take turns to do large glissandos away from the other note

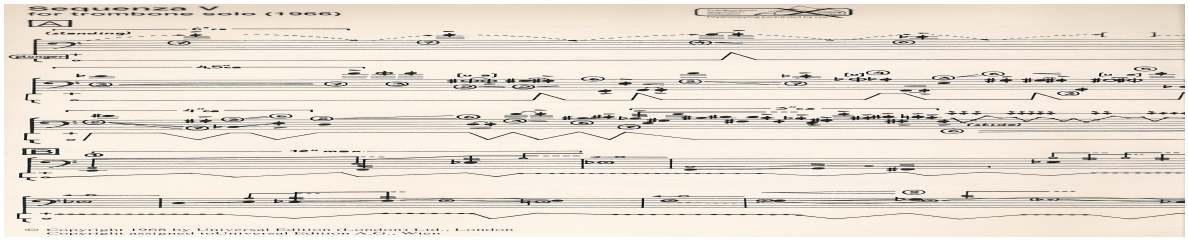
(fig 5) and in the 9th the voice sings a single pitch whilst the instrument actively plays a series of different notes (fig 6).

4c. Composer: Luciano Berio and Sequenza V

Berio composed fourteen sequenzas for different instruments/voice dated between 1958 and 2002 with the aim of expanding the range of sounds as well as a 'virtuosity of sensibility and intelligence.... the piece may become an essay in the instrument's social history' (O.-S. David). A wide range of extended techniques features in each sequenza . The *Sequenza V* is very important in the history and development of repertoire and techniques for the trombone as many of the innovations have now become standard trombone repertoire (Baker, 1994). It is a challenging work for the performer that uses a variety of expanded techniques seldom previously used in trombone repertoire. The approach is very different to previous works and at the time could be considered controversial due to the different way the trombone was played in comparison (Baker, 1994). Although composers were experimenting with different techniques, Sequenza V was the first work to entirely introduce a new idiom in the writing of trombone repertoire, leading the way for radical new techniques to be introduced over the second half of the century (Herbert, 2006). The writing of the *Sequenza V* together with the aid of trombonists Stuart Dempster and Vinko Globokar arguably changed trombone history and influenced more composers than any other work (Webb, 2007). Buddy Baker explains in his article (Baker, 1994) that Berio was introduced to the American trombonist Dempster, having taken an interest in the new and unfamiliar trombone techniques he could produce. Berio then became inspired to write music incorporating them.

Dempster commissioned the *Sequenza V* in 1965 and had performing and recording rights included in this arrangement although he never actually recorded it himself. Multiple performances and recordings of this work have since taken place (Herbert, 2006) and although the premier of the work was performed in London by Vinko Globokar at the request of Berio followed by the first recording, also performed by Globokar, with the recording company Wergo in Germany. The recording was made together with Berio's *Sequenza III* for female voice performed by (Berio's then wife) Cathy Berberian and *Sequenza I* for flute performed by Aurele Nicolet, this took place without Globokar's knowledge of Stuart Dempster's performance rights (Baker, 1994). In Baker's article (1994) the copyright issue of *Sequenza V* is explained. Both Globokar and Dempster describe that Berio wrote a work he called *Essay* which comprised largely of the second half, known as the B section of the Sequenza V which it later became. It is explained to have been written whilst Berio was working with Globokar although Globokar claims to have had no part in the actual composition of the work. The *Essay* was premiered in Buffalo, performed by Globokar. The overall outline of the first half, 'A' section of *Sequenza V*, was initially written by Berio and then further developed together with Dempster who made the suggestions of vowel sounds being incorporated into the music and a deliberately awkward section on the third system which he describes as "scuffling". Dempster and Berio developed 'A' and 'B' sections together and they later became what would be known as the full *Sequenza V*.

Many of the extended techniques such as mute tapping and pitch inhalation were at the time a new idea for most trombonists. Special notational charts were devised for some of the features, a whole separate line is used throughout for operation of the plunger mute (example 7) which features very heavily in this work (Gregory, 1973):

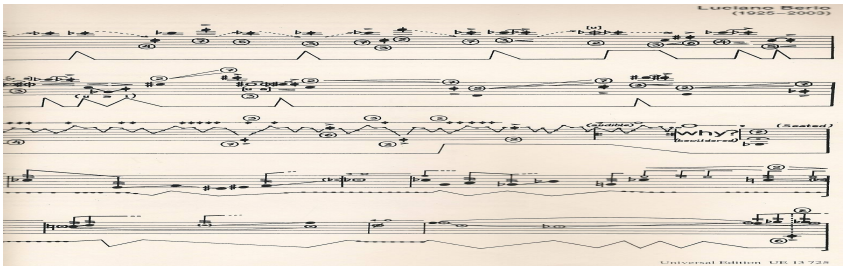


Example 7. Excerpt from Sequenza V by Luciano Berio, ‘B section’ system 4 (Berio, 1968)

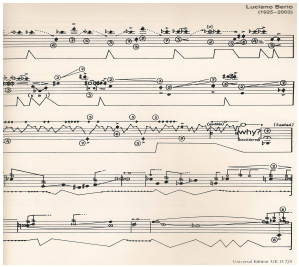
The mute is instructed to be metal to give a specific sound when repeatedly tapped onto the bell of the instrument as indicated by the dotted section of the mute line. This can be seen under the second bar of example 7 (Berio, 1968), Stuart Dempster specifically uses the *Glen Miller Tuxedo Plunger* by mute manufacturer Hulmes and Berg although he initially used a standard plunger mute with metal drawing pins fixed round the edge for the metal sound (Baker, 1994). *Sequenza V* precipitated the development of further trombone techniques, for example the configuration of the instrument (Fulkerson, 1976) and works further involving the use of multiphonics and inhalation with or without pitch. *Sequenza V* works from an original specific pitch of A and expands from this using the harmonic fields associated with the original pitch. Apart from the first line the sound is mostly continuous throughout the rest of the piece with breathing incorporated as part of the sound and any gaps are disguised by the tapping sounds from the plunger mute (Sluchin, 1995). Vinko Globokar explains as transcribed in Buddy Baker’s article (Baker, 1994) that Berio wanted a seamless continuity through the *Sequenza V* and explored the possibility of an electronic device which would continue the note after it was played, allowing the performer to breathe. When this didn’t happen for reasons not explained in the article he decided to use inhaled pitch to cover the links between sections, Globokar couldn’t circular breathe so this was the compromise Berio chose. Inhaled notes are

portrayed using a reverse horizontal arrow with a circle incorporated as can be seen on example 7 above bar 2. Other works containing the use of multiphonics and inhalation with pitch were introduced after the completion of *Sequenza V* for example Globokar's *Res/As/Ex/Ins-pirer* in 1973 and Howard Buss' *Camel Music* in 1976.

Sequenza V was written to represent the two split personalities and lives of the famous clown Grock and his on and off stage personas (Sluchin, 1995). Grock was Berio's neighbour and Berio believed that the commissioning trombonist Stuart Dempster reminded him of the clown from his childhood thus inspiring the personality to be part of his work. Grock was also believed to be the inspiration for *Sequenza III* (Baker, 1994). Grock used the word "warum?" (translated from German as "Why?") in one of his memorable performances and Berio uses the vowels '*u-a-i'* to represent a *WHY?* sound in the piece. The vowels are produced by changing the positioning of the tongue and the cavity shape in the mouth whilst playing the trombone, manipulating the sound of the note rather than sounding them with the voice as a multiphonic. The vocal and instrumental sounds produced in relation to each other are what create the unique effects, the vowel effects specifically create different instrumental sound effects (Fitzgerald, 1979). *WHY?* is also sounded out with the plunger mute as well as sung out loud by the voice, often the '*u-a'* sounds are made but without completing the word with the '*i'*. The vowel sounds can be seen in example 8. The full *WHY?* is sounded out by the performer part way through the piece, as originally done by Grock. This is shown in example 9 (Dempster, 1979).



Example 8. Excerpt from Sequenza V by Luciano Berio, ‘B section’ system 2 (Berio, 1968)



Example 9. Excerpt from Sequenza V by Luciano Berio, ‘B section’ system 3 (Berio, 1968)

Berio writes about his inspiration for the Sequenza V and his experiences of Grock the clown:

In Sequenza V for trombone solo, the memory of Grock, the last big clown, peeps out. Grock was my neighbor at Oneglia: he dwelt in an odd and complex country house in the hills, in a sort of oriental garden with small pagodas, small lakes, bridges, streams and weeping-willows.

> With my school fellows I used to climb over his garden's gates to steal oranges and tangarines. During my childhood the closeness, the excessive familiarity with his name and adults' indifference prevented me from comprehending his genius.

> Only later--I was 11 years old--I had the chance to see him in performance at ``Teatro Cavour'' in Porto Mauricio I realized it. During that performance, just once, he suddenly stopped and, staring at the audience, he asked: WARUM (why). I didn't know whether to laugh or cry, I wished I could do both of them. After that experience I haven't stolen oranges from his garden anymore.
>
> Sequenza V is a tribute to that ``warum'' in English: “why”.
>
> Luciano Berio as quoted in the website of Abbie Conant (Conant)

Specific instructions are given as regards the theatrical element required (Herbert), the performer must attempt to shoot an invisible target in the air and become increasingly hysterical, after a frantic section of music the word “WHY?” is asked of the audience. *Sequenza V* is considered the most theatrical of the whole Sequenza series with the most specific instructions from the composer as to how this is to be achieved. Although *Sequenza III* can also be considered a theatrical work although interpretation is left to some extent to the decision of the performer unlike *Sequenza V* which leaves room for little interpretation. The theatrical element despite being carefully instructed gives the overall impression that it is improvised and spontaneous, as did the performances of Grock the clown who’s performances were largely mimed (Fitzgerald, 1979).

The performer is specifically required to wear traditional concert dress: white tie and tails which could be considered traditional formal concert attire, perhaps then considered unusual or even ironic when considering the contemporary, non-traditional nature of the music to be played. This choice of clothing would likely give the audience a preconceived idea as to the kind of music they would expect to hear which is then completely removed by the performer’s behaviour on stage. Grock often wore a comical version of formal concert dress suggesting that could be

another possible reason for this choice. Many performers however choose to wear different attire than specified in the score, it has become common for this piece to be performed wearing a clown costume hence a possible change in meaning to the music, despite the composer's intentions remaining in the musical instructions of the score (Halfyard & Osmond-Smith, 2007). The stage is required to have only a low chair and stand which is used in the second, more introverted, section of the piece. Stuart Dempster explains that the theatrical element is intended to be humorous and certainly performed the work in that manner himself, the audience laughed when he performed the Sequenza V which was his intention (Baker, 1994).

Soon after Berio's *Sequenza V* was written, *Consequenza* was written by Carlos Roque Alsina, also in 1966. *Consequenza* can be compared to *Sequenza V* by analysis of the techniques used. At first glance *Consequenza* does not appear to have a great deal of similarities, particularly due to the fact Alsina did not use a stave throughout the piece. However a separate line is used for the mute, also a plunger mute as well as a line for the performer's foot. The mute is tapped against the bell of the trombone at various points, a technique very distinctive to Berio's composition. Sung pitches are also used as well as vowel sounds using distortion of the mouth cavity and theatrical instructions (Sluchin, 1995). This could suggest a new direction in trombone technique and that *Sequenza V* influenced compositions in the years to come.

4d. Technique: Micro Tones

In the second half of the twentieth century composers took a greater interest in micro-tones in their music. Notwithstanding early use, a technique which had not

proved popular. Due to the operation of the slide the trombone is easily capable of producing pitches other than what could be considered as part of the tempered chromatic scale. Although variations on conventional pitch had previously been used as part of other techniques such as slide vibrato and the glissando, the flexibility of the slide gave the performer the ability to use sections of the slide in between conventional slide positions as positions in their own right (Dempster, 1979).

Robert Erickson wrote *General Speech* in 1969, a work containing use of microtones (amongst other techniques). The pitch rises and falls slowly displaying the 'in between' sounds. Composer Iannis Xenakis (1922-2001) featured micro-tones in his work *Phlegra* (1975) Quarter tones and three quarter-tones feature in conjunction with glissandi, some of which have to be 'fake'. This is due to the glissandi being used in between notes, they stop and start in between conventional slide positions. Benny Sluchin (Sluchin, 1995) explains this work in more detail in his book *Practical Introduction to Contemporary Trombone Techniques* encourages use of specialist technique circular breathing at appropriate moments in this composition due to the length of some of the phrases.

Peter Eotvos' *Intervalles Interieurs* (1982) follows with pitches a third of a tone different to conventional pitches. Eotvos uses a series of codes written above the stave to specify the exact pitch required (Sluchin, 1995).

4e. Technique: Trombone and Electronics

Combining electronics with orchestral instruments in a variety of ways became increasingly popular from the 1950s as a new area to expand the technical and vocal

possibilities of the trombone. When performing with electronics the instrumentalist must think carefully about the recorded sounds produced so that the instrumental tone can be modified to produce a timbre that complements the sounds. In 1955 Terry Riley composed *Dorian Reeds* with tape delay for Soprano Saxophone and this was followed by other works such as Stockhausen's *Solo* (1966) written for any instrument. However French composer Gerard Grisey (1946-1998) composed using the acoustic properties of sound with human perception, a practice that became known as Spectral Music and included trombone with sonogram analysis in his composition *Partiels* (1975). In 1972 Joel Chadbe wrote a work specifically for trombone titled *Echoes for Trombone and Live Electronics*, this was followed by Peter Oetvos' *Intervalles Interieurs* (1982) for five instruments (including trombone) and precorded tape and Richard Orton's *Ambience* for bass trombone and electronic tape in 1985.

Composer Morton Subotnick devised a machine, the Ghost Box and featured it in his work *The Wild Beasts* (1979) also featuring trombone and piano (Sluchin, 1995; Fulkerson, 1976; Julian). Subotnick explains the ghost box in more detail on his website (Subotnick):

> This is a fairly simple electronic device, consisting of a pitch and envelope follower for a live signal, and the following voltage controlled units: an amplifier, a frequency shifter, and a ring modulator. The control voltages for the ghost box were originally stored on a tape, updated now to E-PROM. A performer, whose miced signal is sent into the ghost box, can then be processed by playing back the pre-recorded tape or E-PROM, containing the control voltages. As neither the tape nor E-PROM produce sound, Subotnick refers to their sound modification as a "ghost score". By providing the performer with exact timings, co-ordination between performer and the ghost score is controlled.
>
> Morton Subotnick

American trombonist and composer James Fulkerson (1945-) is well known in the areas of live electronics and extended techniques. He wrote *Force Fields and Spaces* in 1981 for solo trombone with tape delay, a work in several parts also featuring motivic cells and the trombone with a tenor saxophone mouthpiece (Fulkerson, 1976; Julian).

Another important collaboration between trombone and electronics is the use of recorded sound as an accompaniment. This can replace the need for an orchestra or pianist and allow greater versatility for the performer. The *Motorbike Concerto* (1989) by Jan Sandstrom was originally composed for trombone and orchestra but a recorded tape option is often used by performers as an alternative. This is discussed more fully below (4:g). The use of electronics as accompaniment can raise an issue of its own in that the performer non-traditionally would have to follow the accompaniment and develop the skill in itself to be able to perform in this way. *Bombay Bay Barracuda* by Christian Lindberg (1958-) was a work commissioned by Swedish Television for their millennium show on New Years Eve in 1999 and was premiered by Lindberg himself. The work was composed for trombone and CD accompaniment and the score indicates for the performer to follow the solo line aurally rather than perform it strictly as written. Lindberg had further plans for the composition and it was later made into a short film DVD accompaniment by his son David Lindberg. It can be heard that the solo line in the DVD version is different to the CD in that it has been removed, permitting the live soloist to perform their own interpretation (2008; Lindberg, 1999).

4f. Performer/Composer: Christian Lindberg

Swedish trombonist Christian Lindberg is very much in demand and has known to perform in as many as 110 concerts annually worldwide as a soloist. He has also premiered over 50 works for trombone (Edward) and has an extensive and popular recording catalogue (1992). Lindberg has been a pioneer for trombone soloists as one of the few (only?) musicians to have a full time career as a trombone soloist and to have brought a lot of attention to the trombone (Kagarice, 2005). Inspired by jazz trombonist Jack Teagarden, who Lindberg believed to be the first 20th Century trombonist to express emotion with the instrument, he initially practiced Dixieland jazz. From there he studied for an orchestral career resulting in a seat with the Royal Stockholm Opera Orchestra, however this did not turn out to be what he wanted. Lindberg decided to attempt 'the impossible' to make a career as a trombone soloist, something which had not been achieved before. Although there have been well known trombonists to have made a career from playing the trombone such as Arthur Pryor, they are known to have done so as part of a band or alongside other musical ventures. The trombone had few solo works in comparison to other instruments such as the piano and violin, Lindberg spent five years researching trombone repertoire, re-orchestrating existing repertoire and searching for opportunities for solo work to be written for him to perform (1991). He has documented in his website that there are now over 1000 available trombone works and has listed his favourite 100 (Lindberg). Many works premiered by Lindberg are of a contemporary genre as his 'wish list' of commissions included mostly contemporary and avant garde composers such as Luciano Berio, Iannis Xenakis, Arvo Part, Sofia Gubaidulina, Jan Sandstrom, Witold Lutoslawski, Folke Rabe, Kristof Penderecki, Alfred Schnittke and Toru Takemitsu. Lindberg also encouraged trombone solos from young unknown

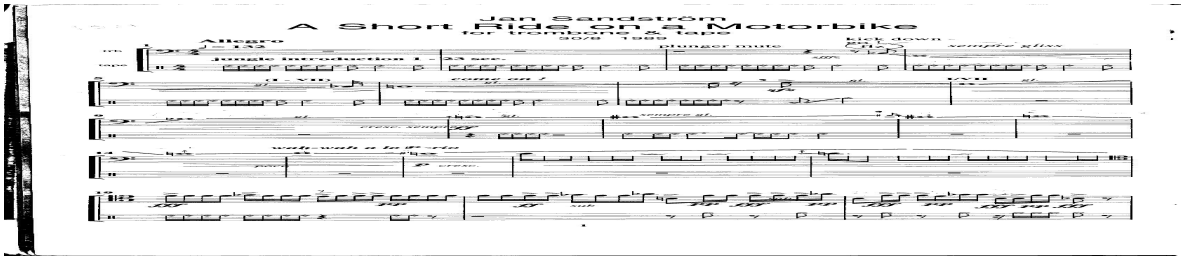
composers, he significantly increased the pool of solo repertoire available to trombonists. Lindberg prefers to work with composers to help them write for the trombone and if this is not possible he prefers them to be as adventurous as they like and then edit the result (Lindberg). When works have been written in collaboration with a specific performer, the personality of the music can take shape with their artistic interpretation to make musical history. In the 1990s Lindberg worked with Xenakis, Takemitsu and Berio to create new trombone concertos (Webb, 2007). Twenty years from the initial attempt at being a trombone soloist, Lindberg found himself to be travelling 200 days per year and so now takes on 5 or 6 concerts per month out of around 30-40 offers. He has been named as one of the top five most important brass musicians of the twentieth century and is believed to have influenced many young trombonists (Kagarice, 2005). At the age of 39 Lindberg began to compose works of his own, many of which are for trombone thus further increasing the available repertoire and raising the profile of the trombone. Some of these compositions have been previously mentioned such as *Bombay Bay Barracuda* and *Kokoka* (Tarrodi, 2012).

4g. Composer: Jan Sandström

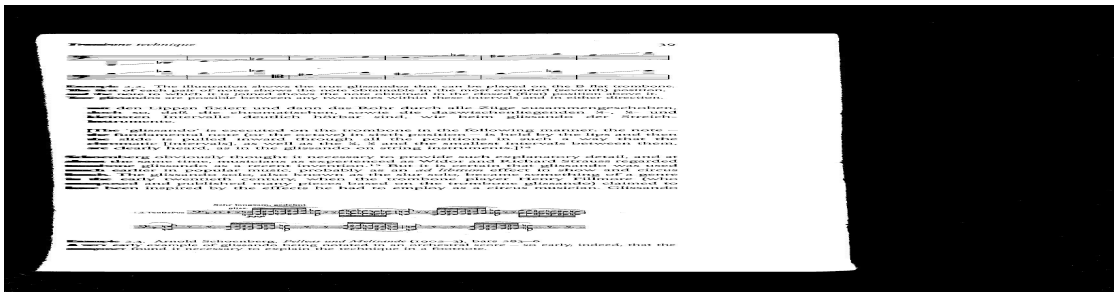
Composer Jan Sandström (1954-) was born in Lapland but raised in Stockholm. Sandström met performer Christian Lindberg in Iceland in 1986 and the two musicians collaborated on a new composition by Sandström which he dedicated to Lindberg. Sandström was relatively unknown at the time, outside of Sweden, Lindberg's performances of his compositions have helped him become a prolific composer (Kagarice, 2005). The composition was named *Trombone Concerto No.1*

but is otherwise known as *A Motorbike Odyssey* or simply the *Motorbike Concerto.* The two musicians also revised the work 2001-2002 and created a shorter version of around 10 minutes in length titled *A Short Ride on a Motorbike* and a backing tape recording was also made as an alternative to the orchestral accompaniment. The main work of around 20 minutes in length was premiered in 1989 by Lindberg, Esa-Pekka Salonen and the Swedish Radio Orchestra. It made a large impact during the 1990s as despite it's avant garde style it reached a wide audience, having been performed more than 653 times (Lindberg). The concerto is believed to be one of the most virtuosic and advanced in trombone solo repertoire with its lyrical and technical requirements and range of over five octaves (Sandstrom).

The work was written as a narrative of the performer's (Lindberg) journeys around the world and describes the places he visits. Sandström's website (Sandstrom) talks of the countries Lindberg has visited and inspired by in real life and wanted to be included in the work. After writing sections of music describing different areas of the globe, the musicians were unsure of how to link up the scenarios until it came to light that the sound of a motorbike could be imitated on the trombone. They decided to use this as the journey tool to bring the work together. Different extended trombone techniques are utilised to make sounds describing different scenarios (2008). The composition is traditionally notated with very precise instructions from the composer.



Example 10. Excerpt (page 1) from *A Short Ride on a Motorbike* for trombone and tape by Jan Sandström (Sandstrom, 1989)

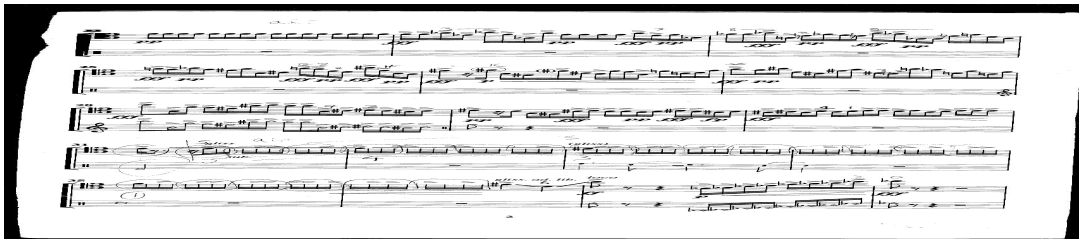


Example 11. Possible Glissandos. Explanation given below (both are from the same source).

> The illustration shows the true glissandos that can be played on the B flat trombone. The first of each pair of notes shows the note obtainable in the most extended (seventh) position, and the note to which it is joined shows the note obtained in the closed (first) position above it. True glissandos are possible between any two notes within these intervals and in either direction.
>
> (Herbert, 2006)

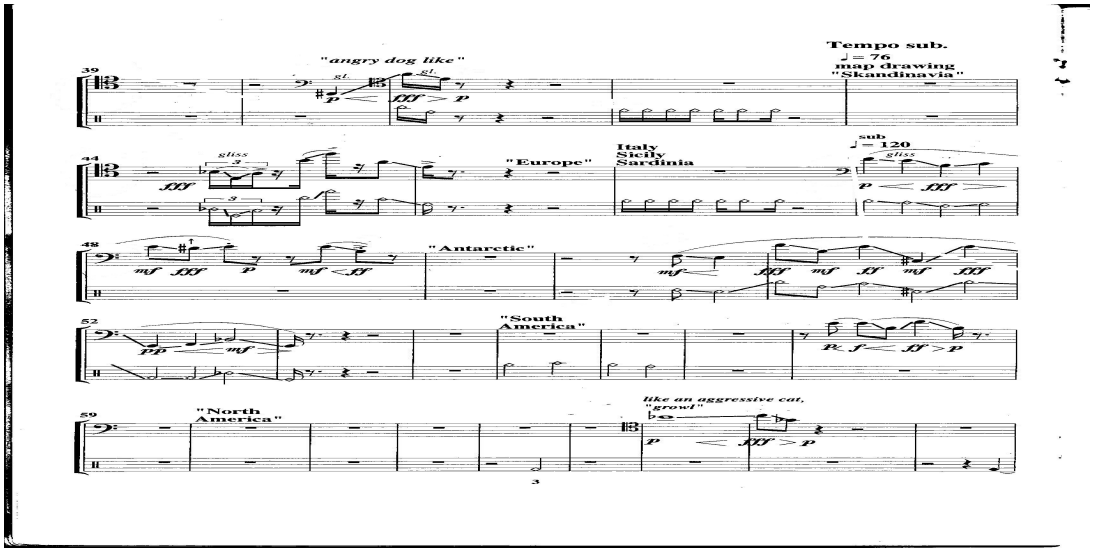
The sound of the motorbike is imitated by the trombone with the use of a growl/flutter tongue played mostly at a loud dynamic and with the extensive use of glissando. The rising glissando gives an effect of the motorbike accelerating and moving the slide

back down to the bottom to begin the next harmonic series rising gives an effective sound of the next gear on the motorbike. The slide positions are indicated with roman numerals and indicated where the slide should be repositioned to a long length to set up for a new long rising glissando (see example 11). Flutter tongue distorts and disguises the sound giving it a rougher timbre to make it sound more like a motorbike and less like a trombone. Sound is further distorted by use of a plunger mute as can be interpreted with the instruction *wah-wah a la Berio* perhaps suggesting that the mute can be repeatedly manoeuvred open and shut imitating the sound of the engine.



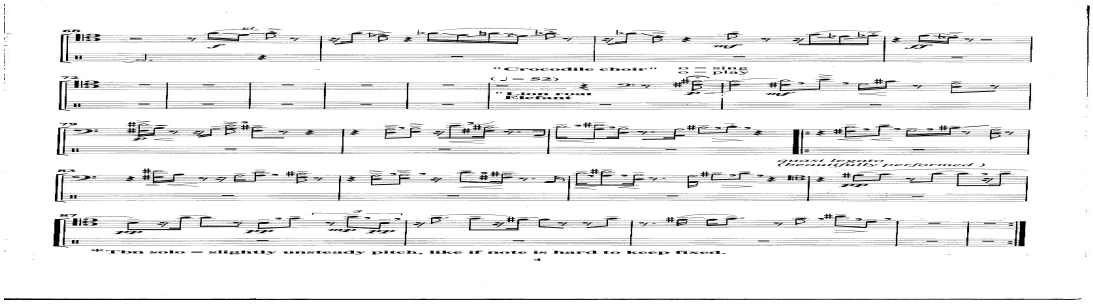
Example 12. Excerpt (page 2) from *A Short Ride on a Motorbike* for trombone and tape by Jan Sandström (Sandstrom, 1989)

Example 12 shows the extremes of range instructed in the performance directions, semiquavers alternate rapidly between *fff* and *pp* with some great leaps of tonal range included. This requires much control from the performer to remain producing a steady stream of accented semiquavers. Most performers would double tongue the semiquavers at this speed also.



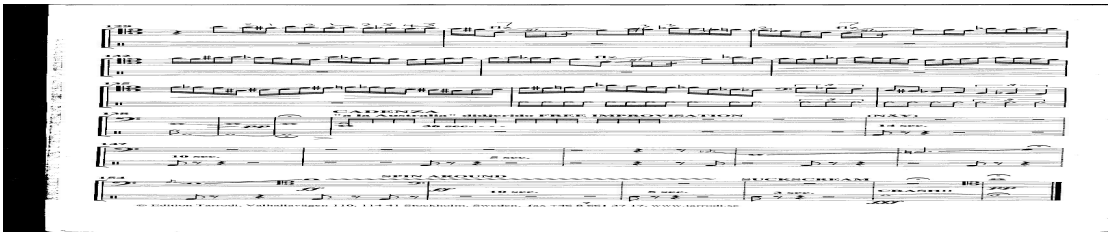
Example 13. Excerpt (page 3) from *A Short Ride on a Motorbike* for trombone and tape by Jan Sandström (Sandstrom, 1989)

Example 13 shows a succession of brief areas in the condensed version *A Short Ride on a Motorbike*. Glissando is frequently used in this section although natural glissando is not possible in every place it has been written. When performing the glissando between bars 40-41 for example the performer would need to false glissando from the low F# up to the A in a much higher harmonic series requiring a strong embouchure, then natural glissando down to the E (see example 11); also with the addition of extreme dynamic changes from note to note of *p-fff-p*. The score states that this motif is to imitate the sound of an angry dog. The score clearly states 'map drawing' and although it is not described exactly what is meant by this instruction, it can be seen that during performances by Lindberg of this work he clearly uses theatrical elements of performance to indicate visibly drawing the outline of the relevant country in the air with the slide of his trombone.



Example 14. Excerpt (page 4) from *A Short Ride on a Motorbike* for trombone and tape by Jan Sandström (Sandstrom, 1989)

In Florida Lindberg once visited a nature reserve consisting of a marshland filled with alligators, exotic birds and wild boars. He describes the scene as a 'unique experience'. Example 14 shows how the scene is musically transcribed by Sandström. The tape backing track includes some of these sounds and the performer provides the sound of the crocodiles. A mixture of played, sung and multiphonic chords are used to represent the sound of a 'crocodile choir'. The multiphonic chords frequently repeat perfect fifth chord between voice and instrument often consecutive and quickly reversing the played/sung scoring. Some of the sounds are marked * instructing that they are to be played with an unsteady pitch and to end with a short rising glissando as marked by the composer. Other chords used are the major/minor 6th and the octave. These are played and sung in a disjointed style possibly being perceived as a primitive sound, resolved by a 'beautifully performed' section using just the trombone without voice. However, this section is still in a disjointed style in keeping with the rest of the crocodile choir section (Sandstrom).



Example 15. Excerpt (page 7) from *A Short Ride on a Motorbike* for trombone and tape by Jan Sandström (Sandstrom, 1989)

The cadenza section of the work (example 15) is an imitation of the sound of a didgeridoo. This part has not been fully notated as it is intended to be a free improvisation. Lindberg's visit to Australia in 1988 was the inspiration for this section, he heard the Aborigines playing didgeridoos formed by tree branches that had been hollowed out by termites. They played the didgeridoo to summon holy spirits and enter a trance (Sandstrom). The didgeridoo also featured in Stuart Dempster's *Ten Grand Hosery* (1972) although in that work the trombonist was required to play an actual didgerido rather than imitate it on the trombone (Dempster, 1979). To imitate this sound requires the trombonist to play low notes whilst also singing to create a multiphonic effect. But with the addition of mouth distortions as the lips and tongue move around as if the performer is chewing. The didgeridoo is traditionally played using circular breathing, a technique involving the inhalation of air through the nose whilst using air exhaled through the mouth to sustain notes. Although this may seem like an appropriate technique to employ for this section of the piece, it is not stated to be a requirement and even Lindberg when performing can be clearly heard to be inhaling through the mouth. The improvisation section occupies over a minute of performing time thus requiring a degree of creativity from the performer, the time is measured out with the tape using regular indicators of the sound NAY! at various

points with the number of seconds remaining clearly given. After this the motorbike is to quickly rev up again using the flutter tongue glissandos of the very beginning of the piece (but notably without the addition of the plunger mute this time) and requires a long and unstable A in a high register. The performer at this point is indicated to use theatrical elements to spin round and play. followed by a ‘suckscream’ where the performer screams whilst inhaling in through the instrument. A loud orchestral crash follows and the performer sustains one final note. During performance Lindberg slowly moves his trombone from a down position up towards the sky during the final note.

5. **Through to the Twenty-First Century**

Development and change is, of course, still in motion with the twenty first century moving to new techniques. Composer/performer John Kenny’s composition *Secret House* (2001), as previously mentioned in the multiphonics section, was written specifically for female voice with trombone and percussion. Rather than using a separate percussionist the trombonist plays all the instruments, speaks, sings and acts. Specific instructions are written to aid the performer and the stage is to be set up in three areas, one for each movement. Percussion used includes wind chimes (one metal of specified pitch, one crockery/pottery, one bamboo/wood), crotales (of specified pitch): all hung on a bell tree, a bass drum, hi-hat (both with foot pedals) and a snare drum. A plunger mute and harmon mute are also required. A wide range of techniques are used in this piece and include inhalation/exhalation, slap tongue, slap tongue glissando, cross harmonic glissando, quarter tone pitches as well as the specific female voice multiphonics (Kenny, 2003).

Kenny is also working with the University of Edinburgh's Development Trust Research Fund (DTRF) to record extended trombone techniques and create an electronic library of sounds. This will then be used to create new works for trombone and computer (Kenny, 2006-2010)

Jazz trombonist Dennis Rollins is becoming increasingly well known for his innovative use of electronics with the sound of his trombone being fed back and creating multiple sonorities during performance (described as a ‘harmoniser’). This is operated by a foot pedal, also used to create *wah-wah* effects in a similar style to the guitar pedal (Milkowski, 2012).

The twentieth century has seen huge change in the voice and the image of the trombone. Techniques have developed beyond recognition since the performances of Arthur Pryor in the early 1900s and have become a diverse palette for the composer and performer to select from. What is interesting is that rather than moving on and discarding previous techniques and music, the new techniques are used in addition to the old. The traditional works have never disappeared from the scene whatever new technique is being used creating a diverse collection of techniques and repertoire for today’s trombonist.

Appendices

Illustrations:

1. An example of a typical early trombone dated 1557. Sackbut by Jorg Neuschel, Nurnberg, in the Anthony Baines Collection (Anthony Baines)
2. The tenor trombone previously owned by Arthur Pryor, made in 1894 by Jake Burkle of C.G.Conn. Owned by Steve Dillon of Dillons Music, New Jersey, USA.
3. Vincent Bach model 42 Bb trombone manufactured by Conn-Selmer (www.conn-selmer.com)
4. Conn 88HO open wrap model Bb/F trombone manufactured by Conn-Selmer (www.conn-selmer.com)
5. An example of a valve trombone: Eterna 998 model manufactured by Getzen (www.getzen.com)

Figures:

1. Diagram of a trombone slide from *The Art of Trombone Playing* by Edward Kleinhammer (Kleinhammer, 1963)

Examples:

1. Cadenza from *The Blue Bells of Scotland* by Arthur Pryor (1901) published by Carl Fischer (Arthur Pryor, 2002)
2. Transcription by Kerry Baldwin of the recorded cadenza from *The Blue Bells of Scotland* by Arthur Pryor (1901) (Author Pryor, 1997)
3. Transcription by Kerry Baldwin of Arthur Pryor performing *We Won't Go Home Until Morning* from recording (Author Pryor, 1997)
4. Excerpt from *I'm Getting Sentimental Over You* by George Bassman as played by Tommy Dorsey in 1932. Full details in additional discography. Transcription by Kerry Baldwin
5. Excerpt from *I'm Getting Sentimental Over You* by George Bassman as played by Tommy Dorsey in 1935. Full details in additional discography. Transcription by Kerry Baldwin

6. Excerpt from *Marie* as played by Tommy Dorsey in 1937. Full details in additional discography. Transcription by Kerry Baldwin
7. Excerpt (4th stave) from *Sequenza V* by Luciano Berio (Berio, 1968)
8. Excerpt (2nd stave) from *Sequenza V* by Luciano Berio (Berio, 1968)
9. Excerpt (3rd stave) from *Sequenza V* by Luciano Berio (Berio, 1968)
10. Excerpt (page 1) from *A Short Ride on a Motorbike* for trombone and tape by Jan Sandström (Sandstrom, 1989)
11. Glissandos chart from *The Trombone* by Trevor Herbert (Herbert, 2006)
12. Excerpt (page 2) from *A Short Ride on a Motorbike* for trombone and tape by Jan Sandström (Sandstrom, 1989)
13. Excerpt (page 3) from *A Short Ride on a Motorbike* for trombone and tape by Jan Sandström (Sandstrom, 1989)
14. Excerpt (page 4) from *A Short Ride on a Motorbike* for trombone and tape by Jan Sandström (Sandstrom, 1989)
15. Excerpt (page 7) from *A Short Ride on a Motorbike* for trombone and tape by Jan Sandström (Sandstrom, 1989)

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