

The development of the saxophone 1850-1950: its influence on performance and the classical repertory

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A mini-dissertation submitted in partial fulfilment of the requirements for
the degree

Magister Musicae (Performing Art)

Department of Music

University of Pretoria

Supervisor: Dr DJ Galloway

Words: 25 296

January 2014

STATEMENT

I declare that the dissertation/thesis, which I hereby submit for the degree Magister Musicae (Performing Art) at the University of Pretoria, is my own work and has not previously been submitted by me for a degree at this or any other tertiary institution.

Then suddenly I hear the real note of the saxophone, unforgettable, high, and clear, as if from a heart of brass, the new thing, the thing we have come to hear. To me it has quite passed out of humanity, this famous upper register, but it is still near enough for me to understand; piercing, musical, the cry of a faun that is beautiful and hurt. The leader tips his instrument into the air; he blows with all his force but his cheeks remain pale. He is now at the height of his art. The voice of our age has come through his lips through this marvellous instrument. He is a priest possessed with half human god, endlessly sorrowful, yet utterly unsentimental. Incapable of regret, with no past, no memory, no future, no hope. The sound pricks the dancers, parts their lips, puts spring into their march. This is the thing that makes the saxophone great and brings fortunes and ruin to its players.

William Bolitho, *The Saxophone* (Bolitho 1924: 421)

ABSTRACT

In the overall academic study of the saxophone and its history there is a considerable lack of integration in how the technological advances of the saxophone enabled the eminent virtuosi of the repertory to accomplish the challenges of saxophone technique and style. This dissertation explores the technological development of the saxophone from when the instrument was first invented in the 1850s to the 1950s.

Concurrent with this investigation, the trajectory of the major repertory of the saxophone is also plotted with the technological developments of each era. This dissertation aims to synthesise and study these two aspects contemporaneously to achieve viable theories to explain the effect that saxophone manufacturers of their particular eras had on the expansion of the classical saxophone repertory.

As saxophone manufacturers expanded and diversified their approach in instrument construction, the players started to gain more facility with aspects like altissimo and intonation to aid them to play the repertoire proficiently. As a result, standards in the course of the first century of the saxophone's existence gradually become higher. This dissertation is grounded in an assortment of secondary historical sources and the concepts that surround them. This work aims to aid saxophone players to not only understand the development of their instrument and repertory, but also the concepts and utilisation of vintage saxophones of previous eras.

KEYWORDS

- Adolphe Sax instruments
- Saxophone manufacturing techniques
- Buffet Crampon
- Selmer
- Buescher
- Classical saxophone repertory
- Saxophone acoustics
- Sigurd Rascher
- Marcel Mule
- Edward A. Lefebre
- Elise Boyer Hall
- Jean-Baptiste Soualle
- 19th century woodwinds

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Chapter 1 Introduction

1.1 Orientation

The saxophone's construction and usage has been modified substantially over its 160 year existence. As the instrument became more popular, the manufacturing techniques, performer ability and tonal requirements changed in accordance with music styles in order to satisfy the growing demands of the public and players alike. Largely, the instrument's construction has not radically departed from Adolphe Sax's acoustical principles (borrowed chiefly from Boehm's flute), but many other developments, like the single octave key mechanism, the underslung neck, reduced and expanded bore diameters and the repositioning of the spatula keys pioneered by French manufacturers, were notable alterations in the 20th century (Ingham 1999: 31-36).

The saxophone manufacturers of our own day seek to produce saxophones that can achieve homogeneity of sound across the range, bright tone colour, projection, volume and a design that can easily be mass produced. This stands in stark contrast to the saxophones of previous eras. The severe competition between manufacturers of previous eras led to companies seeking a unique tone colour for their respective instruments. Saxophone manufacturers continued innovation on the saxophone to make their respective instruments marketable to professionals and amateurs alike in France and America. The differences in French (Selmer, Buffet-Crampon) and American (Martin, Buescher, C.G. Conn) designs were noticeable in terms of tonal concept and key layout. Saxophonists of previous eras had more diverse instruments to choose from to enable them to sound different from each other (Pearson 2011: 1).

The repertory for the saxophone has grown exponentially since its tenuous beginnings when it was used with much enthusiasm and skill by Rossini and Berlioz in their operas (Segall 2005: 15). Thereafter, composers like Debussy and Ravel utilised the instrument frequently. The instrument could however never establish a foothold in the already constituted orchestras of Europe, but found a purpose as a military band instrument (Shepard 2003: 495). Similarly, in

the United States the instrument became popular with the ascension of the American concert band culture, reaching a wider audience in the period of 1915-1930. This period was termed by historians the time of the “Saxophone Craze”. During this particular era, thousands of instruments were sold and musicians like Rudy Wiedoeft, the Brown Brothers and many early Big Bands made the saxophone a popular instrument with the public (Segall 2005: 35-64). The saxophone became an instrument that has found a unique place in both classical and the jazz repertoire. In both styles the different mouthpieces, stylistic nuances, preferred instrument brand and tonal concepts were disparate (Vanderheyden 2005: 4).

In the academic sources studied during the course of writing this dissertation, I have found that there are many resources available regarding the history of saxophone development and the quandaries relating to the history of the repertory. I believe that instrument construction, quality and manufacture played an integral part in what music could be performed on the saxophone and also how composers perceived idiomatic writing for the instrument. It was interesting and worthwhile to investigate technological development relative to repertory expansion, as there are few sources investigating to this aspect of saxophone history. The greatest challenge in writing this dissertation was to trace the development of the music that was written for the instrument, alongside its burgeoning technological progress. It is my opinion that these two aspects have not previously been effectively synthesised. This synthesis of ideas will later be described in the literature review section of this dissertation.

1.2 Rationale

I have played on many different saxophones from different eras and have found that there are noticeable differences in their tonal colour, ergonomics, intonation accuracy and capabilities (especially in the altissimo register). The instrument collection that I possess ranges from modern saxophones to a Buescher Bandmaster alto saxophone from 1924. I have also found that I gravitate to use one particular instrument above another to play particular styles from different eras. I also possess a contemporary Yanagisawa A-902 and a Conn 6M Naked Lady from 1948, both of which are alto saxophones. The Yanagisawa alto saxophone is usually utilised for classical recitals and quartets, while the latter is used for blues, swing and bebop.

There are substantial differences in these two instruments in terms of tone quality, intonation tendencies and bore diameters. The diverse saxophones would be employed to meet the different requirements of the various situations. There are many differences in the instruments from the different eras, especially in terms of timbre.

I have also met and participated in a master class capacity with eminent classical, Dutch saxophonist Arno Bornkamp who has recorded an album *Adolphe Sax Revisited*. On the album, Bornkamp plays on an alto saxophone from Adolphe Sax's factory that was made in 1867 and he plays the instrument in a style that does not always fit with the modern concept of classical alto saxophone, as he uses no vibrato in most cases (like a clarinet player from that era). This inspired me to investigate how instruments of that era were constructed and what their actual capabilities and usages were. The following quote describes what Fétis thought of the early saxophone, after hearing it at the Paris exhibition in 1855:

The tone of the saxophone is beautiful and warm. The character of the sound cannot be compared to any other instrument. Melancholic in its tone, it is less adaptable in rapid passages than it is to melodious tunes and harmonies (Kochnitzky 1949: 46).

Vintage instruments are still very popular among saxophonists and some models are still revered in certain schools of playing, like the American classical saxophone school of John Edward Kelly. This school is influenced by a virtuoso and teacher from an earlier era, Sigurd Rascher. Followers of the Kelly school of saxophone playing still insist on playing on early Buescher models with Sax's prescribed bore diameter and mouthpieces that resemble a hollowed out chamber with a deep baffle and large, round throat like those of Sigurd Rascher (Segall 2005: 238). Generally, this preference for older instruments is most probably evidenced by use of the Selmer Mark VI and Super Balanced Action range of saxophones. These instruments were manufactured from the late 1940s to 1970s and have remained popular albeit expensive and are much sought-after professional instruments which excel at playing many styles of jazz music (Heavner 2013:1). It seems as if the study of vintage instruments and older playing styles are worthwhile to research as it still has present-day relevance.

1.3 Statement of Purpose

The purpose of this dissertation is to assess how manufacturers throughout the saxophone's history during the period 1850-1950 have modified the saxophone relative to the instruments repertory. The aim is to deduce how technological developments influenced what composers could consider when writing music that would suit the particular instruments of their respective eras. I believe that these innovations impacted on the repertory of the instrument, as professional saxophonists could increasingly manage challenges such as intonation, tone, volume and altissimo on instruments of each subsequent generation.

1.4 Value of the Study

The research in this field is a worthwhile endeavour as it gives a new perspective on how the saxophone has changed. I believe that the saxophone has technologically adapted through the players and composers that have popularised the saxophone repertory globally. The focus of the study is to give saxophone players and interested readers much needed insight into what vintage instruments can achieve in different performance environments and also how much today's instrument differs from the initial design of the inventor, Adolphe Sax.

1.5 Research question

To what extent, if any, did the technological development of the saxophone influence classical repertory in the period 1850-1950?

In order to answer the main research question, other ancillary questions must be researched:

- What were the major technological developments of the saxophone from its inception in the mid-19th century to the 1950s?
- How did the technological developments of the saxophone aid players in the management of the increasing demands of the saxophone repertory during the period?
- How did composers perceive idiomatic writing for the instrument throughout period from 1850 to 1950?

- Were the technological developments of the saxophone driven by the innovation of composers, the rising level of saxophonist's proficiency, or the skill and research of manufacturers?
- To what extent did the technological developments alter the original concepts of Adolphe Sax and how did these technological modifications change the concept for the repertory of his time?

1.6 Methodology

This is a qualitative study that focuses on the research paradigms of conceptual and historical studies.

1.6.1 Qualitative research in the dissertation

In qualitative research the aim is to identify raw data and convert the information into categories for analysis (Roberts 2010: 159). All academic articles, books, patent applications, websites and concepts were initially categorised in the following fashion according to their relevance:

- the history of the saxophone repertory
- the technological advancement of the saxophone
- the contribution of players to the repertory and technological advancement.

Qualitative research enables the researcher to effectively synthesise ideas (Henning 2004: 6).

The two separate subjects of saxophone repertory and technological advancement are analysed and concepts are revealed by this synthesis.

Research is also substantiated by an on-going and non-linear process. This makes the dissertation's research method adhere to the principles of qualitative research (Maree 2007: 99). I believe that data analysis can be built on three components that are interlinked and cyclical. This can be described as a process of noticing, collecting and reflecting (Maree 2007: 100).

Hermeneutics plays a significant role in the process of analysis. The older sources that were studied show that they have some hidden meaning within the apparent meaning (Maree 2007:100). The meaning changed as perspectives on the saxophone throughout its history were determined by the social context. Hermeneutics is therefore understanding the art of discourse from another person correctly (Beard & Gloag 2005: 77). For instance, this would be the way that the saxophone was perceived by Berlioz before jazz and the altissimo register were explored and the saxophone did not yet possess the volume or flexibility of later eras. The instrument of Adolphe Sax's time was indeed a very different instrument from what it is today. In 1855 Berlioz described the saxophone from the Adolphe Sax era:

These newly gained orchestral voices have rare and valuable qualities. In the high range they are soft, yet penetrating. In the low range they are full and rich and in the middle range they are very expressive. On the whole it is a timbre quite its own, vaguely similar to the violoncello, the clarinet and the English horn with a half metallic admixture which gives it an altogether peculiar expression. The high tones of low saxophones have a plaintive and sorrowful character; their low tones, however, have a sublime and as it were, priestly calm (Berlioz 1882: 40).

1.6.2 Conceptual paradigm in the dissertation

The dissertation is a conceptual study in the sense that it relies chiefly on secondary sources and that it engages with the understanding of concepts in a critical fashion. The dissertation adds new knowledge and a different perspective on how technological advancement influenced the saxophone repertory. The study is therefore abstract, philosophical and rich in theoretical foundations (Maree 2007: 71-72).

1.6.3 Historical research paradigm of the dissertation

In historical research, the researcher tends to plot a trajectory of a concept (Maree 2007: 73). This was certainly the case when the writer studied the repertory and the technological development where timelines were drawn to plot their developments in order to synthesise and formulate theories from them.

As part of historical research there must be a critical and systematic scrutiny of documents that frequently involve cross-checking records and reports about incidents (Maree 2007: 73). I adhered to this principle and consistently assessed the validity and applicability of sources within the context of the holistic ideas of the dissertation.

1.6.4 Data analysis strategies

I foresaw that inductive data analysis was likely to help in identifying the multiple realities that are present in the secondary sources (Maree 2007: 37). This inductive data analysis approach helped me to identify key themes and concepts by reducing the research material into significant and relevant categories.

This dissertation follows precise methods in acquiring information and synthesising concepts. This can be described in this step-by-step method:

1. A study of the main literature regarding the history of the saxophone as delineated by the literature review section in this research proposal was made.
2. The data was thereafter divided and classified into sections. This manifested in the following categories: general saxophone history, mechanics and technological development of the saxophone, and important classical repertory.
3. The data was then organised as it pertains to the relative time periods: 1850-1900, 1900-1930, 1930-1950. This process made it possible to write a dissertation that had a linear chronological order.
4. A detailed analysis was made of these sources and concepts. Their relation to each other focused on the instruments and their technology, as well as the repertory.
5. A summary was written where a final synthesis of the ideas will be proposed.

1.6.5 Table of data analysis

To make the historical study more precise, yet succinct, I have drawn a table to delineate which instruments will be studied relative to the time period and which works will be studied in relation to the instruments. The instruments and repertory that are mentioned are quite renowned in academic saxophone literature and I have found many sources to enable a thorough investigation of these topics. The works concentrate on the repertory for the alto saxophone as the instrument dominates the genre due to the amount of repertory that has been written for the instrument.

This table was used as the main reference point.

Period	Major saxophone work	Instruments of the relative period investigated
1850-1900	<i>Fantaisie sur un theme originale</i> 1860 by J. Demersseman	Original Adolphe Sax alto saxophones Couesnon alto saxophones
1900-1930	<i>Rapsodie Mauresque pour orchestre et saxophone alto</i> 1901 by C. Debussy	Super-Tone Buescher Bandmaster Selmer Modele 22
1930-1950	<i>Concertino da Camera</i> 1935 by J. Ibert	Buescher Aristocrat saxophones Selmer Super Balanced Action

1.7 Literature Review

Academic publications dealing with good essay writing and research were chosen and a thorough background study was made of the following books, since they contain information on valid, modern research and writing procedures.

Bak's *Completing Your Thesis* (2004) was a worthy publication to start planning the dissertation and to gain a general overview of post-graduate research and writing procedures. Furthermore, as supplementary materials used alongside Bak's book, special reference and attention was given to other sources dealing with academic writing and this included two other works.

Hofstee's publication entitled *Constructing a Good Dissertation: A Practical Guide to Finishing a Master's, MBA or PHD on Schedule* (2006) and *How to succeed in your Master's and Doctoral Studies* (2001) by Mouton aided in presenting a dissertation that was more cohesive.

The research methodology was influenced by two books as these publications have in-depth descriptions relating to qualitative research that is a pertinent research paradigm in this methodology. Maree (2007) wrote a book that deals with the topics in research, entitled *First Steps in Research* and another work that addresses qualitative research is *Finding your way in qualitative research* by Henning (2004).

In accordance to good conceptual research an in-depth study of the literature was conducted as it is intrinsic to concept analysis (Maree 2007: 5). A critical analysis was made of the principal sources that were used during this essay. Data for research was found in books, journals, patent applications and publications submitted in fulfilment for the requirements for a masters or doctoral degree at other universities. The sources either deal with saxophone history, repertory or the construction and technology.

Two main sources that guided all further research were the *The Cambridge Companion to the Saxophone* (1999) by Ingham and *The Devil's Horn: From Noisy Novelty to King of Cool* (2005) by Segall. These books can be considered to be the comprehensive guides to the saxophone history, technical development and repertory, and these publications are widely used and quoted by many researchers in the field of academic saxophone study. Consistent reference to

these two books can be found in many recent articles that have so far been read in compiling this literature review. The mechanical development and repertory aspects are especially well researched and described in these two books.

Many other historical sources also exist relating the early history of the saxophone and agree with what Adolphe Sax envisioned for the instrument. In a concise, but relevant document of 1949, Kochnitzky wrote about the early history of the saxophone in a book entitled *Adolphe Sax and his Saxophone*. The early history of the instrument and the search for compelling repertoire is explained and described comprehensively in this source of information. Other sources relating to this early history can be found in a document that was submitted in partial fulfilment of a doctoral degree at Wisconsin in 1975 by distinguished saxophonist and academic Frederick Hemke entitled, *An Early History of the Saxophone*. Berlioz's *Grande traité d'instrumentation et orchestration modernes* (1855) provides interesting information on the position of the instrument from the view of a famous composer.

The music scores of the celebrated works for the saxophone were also studied. The scores that are available to me mainly consist of piano reductions with a separate saxophone part. This is the case with *Fantaisie sur un thème originale* (1860) by Demersseman and *Rapsodie Mauresque pour orchestre et saxophone alto* (1901) by Debussy. The editions that I studied were published in 2010 and 1988 respectively. I also studied the *Concertino da Camera* (1935) by Ibert from an edition from the same year. I analysed the saxophone part with special reference to the mechanical requirements necessary to play the music. These extracts illustrate how composers utilised the capabilities of the saxophones of their day.

There are many scholarly resources available to study the exact nature of these works for saxophone due to their significance. These publications analyse the history and the concept that the composer had for the saxophone. These scholarly resources include Debussy's *Rapsodie Mauresque pour orchestre et saxophone revisited* by Noyes (2008) and a doctoral thesis by Graves (1998) that investigated Ibert's *Concertino da Camera*. The work is entitled *An Historical Investigation of and Performance Guide for Jacques Ibert's Concertino da Camera*.

In studying the mechanical and technological innovations many sources were consulted. An impressive work by Scavone, which was submitted for a doctorate at Stanford University in 1997 is entitled *An acoustic analysis of single-reed woodwind instruments with an emphasis on design and performance issues and digital modelling techniques*. This publication explains the exact alterations of saxophone acoustics by manufacturers. This work is analytical and systematic in nature and looks especially at the many changes of the parabolic cone of the saxophone throughout its history and how these modifications affected the tone, intonation and range of the saxophone. Scavone references many other academic works that relate to saxophone acoustics, mechanics and design like Jaap Kool's *Das Saxophon* (1987). Another interesting article that looks at musical instrument manufacturing techniques and innovations in the factories of Adolphe Sax was written by de Keyser in 2003; the article was published as *The Paradigm of Industrial Thinking in Brass Instrument Making during the Nineteenth Century*.

Howard's important *Saxophone Manual* (2009) is a definitive source of information on the saxophone that is very important to instrument repairers and academics alike. It describes the construction of the saxophone in considerable depth and also looks at the way instruments were designed and manufactured. Important aspects, such as vintage rolled tone holes and ribbed key construction on later instruments are investigated. This publication is the most noteworthy reference with regards to the mechanical and technological aspects of the saxophone.

There are also many vital resources of early classical saxophone virtuosi available and these resources contain information on how they regarded the repertory of their age and also the instrument design of their respective eras. Eugene Rousseau, another prominent saxophonist, dedicated a work to Marcel Mule entitled *Marcel Mule: His Life and the Saxophone* in 1982. In this book he looks at approaches to the technical quandaries in the *Concertino da Camera* and also the saxophones and mouthpiece technology that Mule had available in his day. Another work that deals with a famous saxophonist Edward A. Lefebre and his contribution to the repertory and technological development is by Noyes (2000a); the work is named *Edward A. Lefebre (1835-1911): Preeminent saxophonist of the 19th century*.

Substantial research is also available to discuss the different models and brands of instruments. A resource dealing with the general history of the construction of the saxophone by specific brands that are indispensable is a doctoral thesis from 2002 by Bro entitled the *Development of the American-made Saxophone: A Study of Saxophones Made By Buescher, Conn, Holton, Martin and H.N. White*. There are also numerous articles from the *Saxophone Journal* by Paul Cohen that investigates saxophone manufacturing history. Detailed descriptions of patents by the Selmer Company from previous eras are also available and written by Maurice Selmer (former president of the Selmer Company). One such patent application was useful for the purpose of this dissertation is his *Octave vent for saxophones or similar instruments* that was written in 1941.

Overall, these sources deal with repertory and saxophone technology separately. However, there is not many research or scholarly articles that deal with which instruments were played at the time when important compositions of the classical saxophone concert repertory were written. If these sources were integrated a new perspective could emerge on how the saxophone construction influenced composers to write idiomatic repertory.

1.8 Delimitations of the dissertation

This dissertation focuses on the alto saxophone repertory and manufacturing history. My research has shown that the alto saxophone was the most prominent instrument used for the classical saxophone standard repertory from 1850 to 1950.

This dissertation does not aim to look at the whole repertory for the saxophone and chiefly focuses on the important works, players and developments. Mainly, as far as the classical repertory is concerned this includes *Fantaisie sur un thème originale* (1860) by Jules Demersseman, *Rapsodie Mauresque pour orchestre et saxophone alto* (1901) by Claude Debussy and Jacques Ibert's *Concertino da Camera* (1935). Although there are many other important works that were written in the saxophone's first century, for the purpose of this mini-dissertation it is not possible to analyse more than three works. Further research with the same concept should be undertaken on works by Glazunov, Creston and Tomasi.

The dissertation does not aim to look at the development of all saxophones and mouthpieces across all the generations of instrument construction. The dissertation focuses on the following important instruments: the original Adolphe Sax saxophone, early Buffet Crampon, Buescher and Selmer saxophones. References to these instruments are made as they were popular with both concert and jazz performers of their age.

It is currently impossible for even the most assiduous classical saxophonist not be influenced by the jazz tone and sound as the saxophone is an iconic instrument of jazz; thus at least a functional knowledge of jazz is necessitated (Vanderheyden 2005: 10). Although the impact of jazz is studied because it has certainly affected saxophone design and certain aspects of the classical repertory, this is not the main topic of discourse. The classical alto saxophone and its repertory is the focus of this dissertation.

The topic can possibly become too wide, so careful attention has been paid to selecting the most important repertory, manufacturers and players. As such, the discourse concerns itself with iconoclasts like Rascher, Mule, Leeson, Lefebre, Souallé and Hall. The dissertation limits itself to their contributions to the repertory and saxophone technology through the manufacturers that they supported and endorsed.

The dissertation is not a treatise on acoustics or all the scientific aspects that govern the design and construction of the saxophone as this necessitates another dissertation like Scavone's *An acoustic analysis of single-reed woodwind instruments with an emphasis on design and performance issues and digital modelling techniques* (1997). Instead, the focus is on the investigation of how the various acoustic and technological developments impacted the music of the respective eras. The dissertation is more of a historical study than a scientific one.

1.9 Chapter outlines

Chapter 2 summarises some of the apposite developments of the 19th century woodwinds and looks at the manufacturing techniques of the revolutionary developers of the age: Boehm, Sax and Mahillon. The chapter investigates the concepts that influenced the Adolphe Sax instruments and the subsequent designs of the early saxophones. This section also looks at how

the experimental repertory, along with illustrious soloists worldwide helped the instrument gain an identity in the concert hall as a solo instrument.

In Chapter 3 the next era is analysed with special reference to the impact of the saxophone virtuosos of the era, like Edward Lefebre and the Smith and Holmes duo. Through their indefatigable efforts in their respective milieus, they managed to promote the concert saxophone to new audiences. By the early 1900s, a famous composer like Debussy had already been exposed to the sonorities of the saxophone, but popular demand for the instrument limited its utilisation chiefly to the vaudeville circuit and dance bands. New saxophone manufacturers from North America were challenging the best brands from France and a competitive environment began emerging. This interesting era would prove decisive in instrument manufacturing and repertory and continue into the next time period under investigation.

The penultimate chapter investigates the period 1930-1950. By this time the soloists and manufacturers have done more for the saxophone and increasingly innovative and challenging works were being written by composers. Virtuosi like Sigurd Rascher and Marcel Mule receive special attention in this chapter due to their extraordinary efforts to promote their distinctive schools of saxophone playing. The apparent modifications to the saxophone in this era made it possible to play the instrument in a virtuosic fashion, with the range being pushed to the extreme and the technical facility in managing florid melodic lines improved. This era had major developments in saxophone manufacturing techniques, some of which were partly influenced by the proliferation of jazz. Composers started to write for the saxophone globally and the works of Glazunov, Ibert and Creston became important milestones in the later history of the saxophone.

In the final chapter, the ideas of this dissertation are presented in a relevant manner as they pertain to the various research questions. The key concepts and conclusions of the research are displayed in this chapter by synthesising the myriad sources that were studied.

Chapter 2 Saxophone repertory and development from 1850-1900

2.1 Introduction

The history of 19th century woodwind instrument design and technology must first be investigated in order to understand the pioneering manufacturing work of Adolphe Sax and the instrument that bears his name, the saxophone.

In the 19th century significant innovations from instrument manufacturers substantially improved the quality of woodwinds. This was mainly due to the effort of a flute maker Theobald Boehm, whose innovations were influential in the development of the earliest saxophones. His innovation, known as the Boehm system flute, was endorsed by an esteemed flute maker of the time, Louis Lot. Flautists of the era were quick to follow suit and emulate his design based on the accurate acoustics of the flute was praised and rapidly influenced other woodwind designers of the time (Porsteinsdóttir 2010: 20). By 1847 the new transverse flute that he designed enabled more consistency in tone and more accurate intonation. Other instrument designs like those of the oboe (although with limited success) and clarinet were also influenced by Boehm's innovation (Randell 1999: 78).

In creating a new flute that would influence later woodwind design, Theobald Boehm had calculated mathematically what improvements would be necessary in flute design. The holes on the flute were to be bored for all chromatic notes, which had to be located at their acoustically correct positions. These holes were to be as large as possible in order to facilitate better projection and the mechanisms were arranged so that the fingers could have possible control of all the holes by means of keys, hole-covers and springs (Piston 1969: 129).

Adolphe Sax, as a student at the Brussels Conservatory, was interested in these technological developments as he was a student of both the flute and the clarinet. He also had a profound musical proficiency and he had already worked on instruments since the age of 6 in his father's musical instrument shop. His father's instrument manufacturing skills were well-known in Belgium. He was therefore well-informed and experienced in instrument manufacture (Kochnitzky 1985: 5). Sax could have pursued a career as a clarinetist but appeared to have

been preoccupied by his ambitions in improving on the acoustical shortcomings and faults of the clarinets of his day (Ferraro 2012: 2). It was in this era of fervent technological progress that Sax envisioned an instrument that would blend well with both the other woodwinds and brass. Consequently he designed an instrument that possessed elements of both instrument families. Sax started to experiment with a design where a single reed mouthpiece was fitted on a conical brass body (Teal 1969: 13).

Some historians, like Frederick Hemke, an esteemed saxophonist and academic, proposed other possible theories in his well-researched Ph.D. dissertation of 1975. Hemke attested that there could have been more possibilities in generating the invention of the saxophone. One such theory would be that Sax was attempting to change the arguably non-intuitive fingering system of the clarinet to behave more like a Boehm system flute and therefore enable the clarinet to overblow an octave. Some scholars believe that this concept resulted in the invention of the saxophone. It is also probable that he substituted the cup mouthpiece of the ophicleide (an instrument now reduced to near obscurity) with a single-reed mouthpiece. Thirdly, he could have experimented with a single reed mouthpiece on a rudimentary bassoon. Many also believe the invention to have happened by mistake or accident (Hemke 1975: 357).

I believe the fourth statement to be a false assumption in discussing the invention of a saxophone as Sax provided detailed information on his theory of saxophone acoustics. These theories were later confirmed by Hertz in the 1890s. Sax had to endure many court cases that were initiated by instrument makers whose very livelihood depended on the extermination of his invention. He also accused his competitors of ignorance in the necessities of proportions in their instrument design. This suggests that Sax was indeed a calculated and astute student of acoustic phenomena as it pertains to woodwinds and that his invention was by no means an accident (Segall 2005: 174-175).

Unfortunately, the saxophone and its inventor were beset with legal struggles from jealous instrument manufacturers, bankruptcy due to poor management of finances of Sax's factory, his failing health and the abdication of Louis Phillippe in the turbulent revolutions of 1848. By all accounts, Sax's incredible scientific and musical mind was not matched in equal measure

with adept business acumen. Louis Phillippe, monarch of France, was actively befriended with Sax and believed that his instruments would radically change the French military bands. These military bands were notorious for their lack of standards, discreditable sound and were generally perceived as an embarrassment to French patriotism. The early inclusion of saxophone players immediately reversed the perception. Even the Prussian military (the great enemy of the French state of the time) were interested in using saxophones as part of their regimental bands. Regrettably, with the abdication of Louis Phillippe the other instrument-makers in Paris were swift to remove any inclusion of saxophones in the military bands and the instrument would almost fade towards obscurity in its infant stages. Later, France was severely humbled and defeated in the Franco-Prussian war of 1871 and that led to the financial support for the Paris Conservatory and military bands being reduced to the level where Sax could no longer instruct new musicians to play his instrument (Ingham 1999: 7-10).

Despite all these oppositions, the instrument survived the rigours of its infancy. The persistence of the instrument is partly due to the pioneering labours of Sax. The early players and composers of the instrument helped to keep the vision of Sax alive through inspired compositions that survived its tenuous beginnings.

2.2 Acoustic and technological developments of the Adolphe Sax saxophone

One of the main differences regarding the manufacturing of a saxophone when it is compared to other woodwinds is the fact that most saxophones (from the time of Adolphe Sax) generally have a very large bore. The conical tube that the saxophone possesses makes the instrument rich in harmonics and the reduction of the bore towards the mouthpiece facilitates the easy production of fundamentals. This leads to the extension of the two and a half octave range that Sax himself believed would be part the acoustical potential of the instruments (Ingham 1999: 24). Sigurd Rascher's practising and research that will later be discussed in depth in this dissertation, confirms this as an acoustical possibility as his research has shown that Adolphe Sax himself could manage three octaves on his early prototypes (Rascher 1983: 5).

To facilitate a scale of fundamentals on the saxophone the tone-holes need to be reasonably large. This acoustic fact is significant as this allows the player to have a great range of volume,

flexibility of tone quality and intonation which gives the individual a considerable amount of interpretative possibility. Clarinet players, for instance, would notice that the French clarinets of the 19th century have a much smaller bore than those of previous eras and that has considerably improved the intonation of their instruments, while saxophones did not have such an amenity, as this would affect the tone (Ingham 1999: 25). Indeed, this is confirmed by another source that stipulated that Boehm system clarinets from the era range from 13.3 to 15.0 mm in diameter (Lawson 1995: 29). The saxophone differs in the sense that it is characterised by its large bore diameter which results in low input impedance (Rossing 1990: 225).

The Adolphe Sax saxophones differed considerably in the sense that the bore taper plays a bigger role in intonation and its gradual expansion towards the end of the neck (lower bow) was a particular aspect that was different from other woodwinds in the 19th century (Scavone 1997:27). The diameter of the bore does not increase uniformly, like some other woodwind instruments, but in a way that is governed by the geometric rules of a parabola (Segall 2005: 176). This dissertation is by no means a discourse on saxophone acoustics as this requires a different study altogether, but many sources are available to saxophonists that are not academic scholars. In Jaap Kool's study (1987), the acoustic occurrences of the tone relative to the parabolic shape of the instrument are explained in understandable terms:

Sax chose this parabolic shape intentionally. We know that the sound waves, exactly as light waves (say, on a mirror), are reflected. From an echo, for example, we know, that under certain circumstances the emitted sound is reflected back to its starting point. This reflection is the greatest, that is, it is most complete when the sound is reflected from the focal point of one parabolic body to the focal point of another parabolic body. This means, in practice, that one can direct the course of sound waves in a desired direction. Sax employed all these parabolic surfaces and their effects in the saxophone. First of all, the parabolic inner walls operate like the convex mirror, diffusing the sound and, at the same time, reflecting it into the tube's interior. This is how the uniquely sonorous, mellow, and at the same time, somewhat hollow sound of the saxophone is produced, which on inferior instruments is easily associated with a ventriloquial note. Still dissatisfied, Sax put in three other small parabolic concave surfaces, or slight curves. If we list the diameters of the tone holes in succession, it becomes obvious to us that these diameters do not regularly increase as the gradually increasing diameter of the tube would cause. On three occasions, we find that a lower tone requires a smaller tone hole

than the preceding higher tone. At these three places Sax once again employed small parabolic bulges in the opposite direction of the overall curve, which extends across the entire instrument. These inward-turning parabolic surfaces operate like the concave lens, that is, they focus the sound. Since at the opposite wall (directly in the vertex of the parabola) there is respectively a tone hole, these surfaces simultaneously effect an easier escape of the sound waves (Kool 1987: 83-87).

It was not only Adolphe Sax who referred to the parabola as the most appropriate theoretical framework to solve the musical problem of a brighter and more brilliant tone with consistent tone quality throughout the entire range of the instrument. Other instrument manufacturers, like those already mentioned, Theobald Boehm and Victor-Charles Mahillon, speculated that the study of the parabolic shape was to be considered the theoretical paradigm for progressive wind instrument makers (De Keyser 2003: 240).

Therefore, the parabolic cone, as the central tenet of saxophone construction in this era, is a valuable area of investigation. Hemke's translation of an original patent text by Sax explains the thought process that governed saxophone construction after considering many possible acoustic solutions to existing instruments:

Struck by these different drawbacks, I have looked for a means of remedying these situations by creating an instrument, which by the character of its voice can be reconciled with the stringed instruments, but which possesses more force and intensity than the strings. This instrument is the saxophone. The saxophone is able to change the volume of its sounds better than any other instrument. I have made it of brass and in the form of a parabolic cone to produce the qualities which were just mentioned and to keep a perfect equality throughout its entire range. The saxophone embouchure uses a mouthpiece with a single reed whose interior is very wide and which becomes narrower at the part which is fitted to the body of the instrument (Hemke 1975: 48).

The Adolphe Sax saxophone and its innovation in acoustics of the time was studied in considerable detail by a scholar already mentioned, Jaap Kool. Jaap Kool (1987), amongst other professionals of more recent times, attests that the unique parabolic, yet somewhat conical shape of the Adolphe Sax era affords more flexibility and tone quality than their modern counterparts (Scavone 1997: 72). The Adolphe Sax instrument has also been seen as having a darker tone quality that has been ascribed to a misalignment of higher partials in the

instrument itself. These harmonics are prevented from co-operating fully in the frequency of oscillation that demonstrates less extreme spectral energy. The sound is also said to be more focused and this quality could be associated with the appropriate alignment of the lowest and strongest resonances of an air column. As a drawback, the instrument design might have sacrificed its high harmonic alignment to achieve better alignment of the lowest resonances to facilitate a richer sonority in the instrument (Scavone 1997: 73).

The parabolic cone and shape of the bell have been the subject of much debate in saxophone acoustics. Some scholars, like Dr. Cohen believe that the parabolic cone of Adolphe Sax instruments had very little to do with the tone and sound of the saxophone:

Whatever difference the parabolic cone (theoretically) makes in the sound pales in comparison to the mammoth difference in tone, pitch and response small changes to the neck and upper body bore dimensions create. Trying to find and define the mythical parabola misses the huge point of other far more significant delineators and influences (Cohen 1997: 8).

Indeed, many collectors favour certain vintage saxophones for their narrower bore diameter and the blowing resistance that the instrument produces as a consequence of these narrow dimensions. Many believe that this is one of the chief reasons why saxophones from different eras have different qualities in terms of timbre (Pinksterboer 2007:53).

Another area of dispute regarding the tone of the Adolphe Sax instrument is its mouthpiece as its dimensions and specifications would affect the tone quality of his day and age. Sax seems to have had difficulty in this respect, especially when proportions were concerned and this was always in a process of trial and error. The first experimentations to be conducted in a scientific manner were achieved by Henri Selmer and his sons in the 1880s. In general, the saxophone mouthpieces of the era were made of wood and resembled a hollowed out chamber, with a deep baffle and a big, circular throat. Some purists still believe this to be the most appropriate design for the saxophone mouthpiece (Segell 2005 174).

The fingering system that Sax employed on the saxophone was no accident. Sax worked with proportions and calculus in order to establish bore dimensions on the one hand, and the

placement and dimensions of tone holes on the other. This was a continuation of the work of Boehm and Mahillon. Sax and the woodwind and brass innovators did not rely on tradition alone, but scrutinised designs and dimensions through a process of scientific research. This critical thought paradigm would inform woodwind manufacturers for the rest of the 19th century and contribute to their technological innovations (De Keyser 2003: 251).

In ergonomic design the saxophone was still in its infant stages. When regarding saxophones from the 1860s, it is noteworthy that the normal range only includes B3 to F6¹, dual-octave keys and no rollers between the Eb and C, or on the G#, low C# or B keys. The keys are also small and there is no side key C available (Reeves 2009). The front F-key was not universal until the 1900s and the double octave mechanism was changed by that time to install an automatic change-over mechanism. This was achieved by a system of two levers, one operating and one intermediary, plus the two actual octave keys that relied on the different strengths of four springs which changed from the lower to upper vent, changing halfway up the second register (Ingham 1999: 31).

The proliferation of different saxophone voices was a definite concept in the mind of Sax. One can derive that Sax also intended that the fourteen instruments he designed could be played by all saxophonists to give players many options regarding range and timbre of the various instruments. This is self-explanatory when one considers that he kept a uniformity of fingering on all saxophones and so that all of them could be notated in treble clef. The instrumentalists were quickly able to become “saxophone technicians” who could double on various saxophones as well as clarinets due to the ingenious design (Ingham 1999: 94). The saxophone family was originally intended to be split in two different families, each of them ranging from soprano to contrabass. The one family was intended to be pitched in F and C (for orchestral instruments) and the other in Eb and Bb (for military bands, since wind instruments pitched in these keys were frequently utilised). The F and C instruments were quickly marginalised in orchestral settings, because German manufacturers and competitors like Wilhelm Wieprecht regarded his instrument with derision and went to great lengths in court cases, bribes and murder attempts

¹ D3 to Ab5 in the non-transposed range

to denigrate Sax and harm his image in orchestras (Segall 2005: 21-23). The Eb alto saxophone soared to popularity as a solo instrument and became the preferred instrument for many saxophone players. Soon many virtuosi emerged who promoted the alto sax as a solo voice. Even within the first twenty years the saxophone's chief function as a bass voice blending with other woodwinds and brass would change to what would quintessentially become a solo instrument in classical music (Hemke 1975: 42-43).

The F and C saxophones had a somewhat more delicate sound as a result of the higher tuning used in orchestras at the time, but once the saxophone found a somewhat fragile and uncertain position in some orchestras (more as an occasional double for the clarinetist), the tone of the Eb and Bb saxophones were more favoured (Pinksterboer 2007: 145). The Eb and Bb saxophones of the time were then standardised to the French tuning for military bands (A=435Hz). It is evident that Sax did not aim to add any solo voice to the orchestra with his initial prototypes (Ferraro 2012: 29). The first saxophone prototypes were certainly bass voices, due to their musical role being similar to the euphonium, which was also descended from the bass-ophicleide (Morris 2007:1). The earliest performance on record of the classical use of the bass saxophone was in Berlioz's *Chant Sacré*, and was played by Adolphe Sax himself. The other voices were only later additions. This eventually led to the instrument becoming a solo voice, with the alto saxophone being favoured by early performers (Ferraro 2012: 29).

As soon as the original Adolphe Sax saxophones were invented, other inventors were swift to improve on the designs of the original saxophones. When the saxophone patent expired in 1866, the Millereau Company made a forked F# key and patented the design. The Gautrot and Pierre Louis Company manufacturer in Paris was soon to improve the pad system on the saxophone. A screw-in pad mechanism and system inside the pad cup was devised to keep the outside of the pad flat. By 1881, Sax had lengthened the bell to include the low Bb and extended the upward range with an F# and G key with the addition of a fourth octave key (a somewhat flawed design that did not become the norm for manufacturers as it was

ergonomically impractical). By 1887, the Association des Ouvriers had invented the bis² key and an improved forked F#. In 1888, Lecomte was the first company to devise the single octave key mechanism and rollers for the Eb and C keys. However, players like Jean-Baptiste Souallé were dissatisfied with the design of the double octave mechanism and proceeded to remove it before mainstream manufacturers decided to do so (Hemke 1975: 82-86). The alto saxophone tone holes were also not very large and that reduced the saxophone's volume to a certain extent. This is another factor that contributed to the darker sonority of Adolphe Sax instruments (Howe 2003: 17).

It is worth noting that a patent application by Couesnon would be an important forerunner of what would become the design parameters of the modern saxophone. The patent application was submitted on March 11, 1888 and its patent number is FR189198. In this document Couesnon had detailed descriptions of mechanisms that would allow the F and F# keys to close the G# key and a detailed description of a Bb key that made low Bb possible. An inclusion of a high F altissimo key, an Eb key that could be played with the right-hand little finger and a G# trill key were included in this design (Hemke 1975:88).

The biggest saxophone manufacturer of the age after the Adolphe Sax Company was Buffet-Crampon and they had manufactured about six thousand saxophones in Paris in 1866. Before American saxophone manufacturers gained a position of dominance in the industry there were also experimentations in Italy and England, with Boosey and Co. and Besson and Co. being the prominent examples in Britain. It was still however clear that the centre of saxophone manufacturing was based in Paris, France (Ferraro 2012: 41).

To conclude this part of the dissertation, I offer a summary that can be deduced from the above-mentioned academic sources. From the day the first saxophone was invented and publically displayed in front of audiences it was substantially modified by other inventor, also and by Adolphe Sax as he was always seeking improvements. The first saxophones that were designed were meant to increase the volume of some of the bass voices in the orchestra, but as

² The bis key is a small key between the B and the A key that enables the saxophone player to play Bb with only the index finger. This major addition enables saxophone players more flexibility when playing in flat key signatures.

prototypes in the higher register were constructed the instrument became ideally suited to the soloist (most of these early soloists being adept clarinet players). This somewhat endangered instrument was by no means guaranteed a place in the orchestra or chamber music and required a body of repertory to continue its development, especially works that displayed the unique characteristics of the saxophone.

2.3 Early repertory

It is certainly beyond the scope of this dissertation to look at all the repertory from the 1850-1900 era, but the most important developments will be studied in relation to the capabilities of the instrument of the time.

In Berlioz's time (that coincided with Sax making his first prototypes) the saxophone was thought to be a simple addition to the clarinet section (Baines 1957: 146). Although the instrument was relegated to only military band usage, it facilitated doubling possible for flautists and clarinetists because it was easy to learn, forgiving in its tone production and relatively inexpensive to make. The saxophone had a simple metal body attached to a clarinet type mouthpiece, which explains why many of the soloists that will be mentioned later in the essay were adept clarinetists. Writers like Gioia, who write from a jazz historical perspective, have not realised the full spectrum of early classical saxophone repertory and also assert that there was a lack of repertory in the early classical saxophone years in France (Gioia 2011:104). It will be illustrated in the following few pages that there were substantial efforts made to increase the repertory. Forward-thinking composers (who were also good friends of Adolphe Sax) and musicians that played the first saxophones were enthusiastic in experimenting with the instrument. Segall attests that Londeix did much to expand the knowledge of the early repertory by searching and cataloguing the older works in his *150 Years of Music for Saxophone* (1994). In this voluminous study, Londeix found that there were many more works available for the saxophone in its early history than was commonly believed (Segall 2005: 30).

Adolphe Sax realised that the saxophone needed a substantial repertory to stand the test of time and overcome the challenges of an infant musical instrument in an established musical world. He worked to ensure that a collection of repertory could be made possible by creating a

sheet music publishing house which existed from the 1850s to the 1870s. There were seven initial composers that wrote works for the saxophone and piano. The four composers who became well-known for their contributions were the renowned cornet player, Joseph Arban, the eminent flautist Jules Demersseman, clarinet virtuoso Hyacinthe Klosé and Jean-Baptiste Singelée. A large body of their works were used for the *solos de concours*. These pieces were used for examinations by the Paris Conservatory for students and this enhanced the instrument's status within tertiary music studies (Ingham 1999: 52). Londeix believes that the first repertory that was written did not lack quantity, but was unfortunately lacking in quality (Segall 2005: 31).

By 1857, within the first decade of its existence, formalised instruction on the saxophone and saxophone instructors started to spread out from France (Noyes 2000b: 13). Berlioz believed in saxophone instruction at the highest level and supported the idea of specialised saxophone teachers. He believed this to be the key factor in enhancing the instrument's stature in 19th century music:

The saxophone, the latest member of the clarinet family, an instrument which will prove extremely useful when players have learned to exploit its qualities, should be given its own separate position in the curriculum, for before long every composer will want to use it (Ferraro 2012: 30).

Perhaps this attitude that the saxophone was regarded as easy to master was a major factor in the lack of quality in the early saxophone repertoire as many performers (who were mostly clarinetists) lacked enthusiasm for the instrument and failed to realise its true potential as an instrument. Fétis writes in 1855 about this disregard for the idiosyncrasies of the instrument:

Mr. Sax has created another instrument, the saxophone, a delightful brass instrument with a clarinet mouthpiece, which possesses a new timbre and lends itself to the most delicate and vaporous effects of shading as well as the majestic accents of religious style. Mr. Sax has made an entire family of saxophones and if composers do not as yet appreciate the value of this new organ, which they owe to the genius of the inventor, the inexperience of the performers can be the only reason. The saxophone is a difficult instrument; the player can learn its technique only after long and serious

study, but it has, up to now, been only too imperfectly played and too little practiced (Hemke 1975: 177).

The early saxophone was also considered an incredibly easy instrument to master by other woodwind instrumentalists and they were quick to experiment with the instrument and its repertoire. An article in the *Revue et Gazette Musicale* from 1852 has cited the following in describing the new instrument to the woodwind players of the day:

For those of our readers who have possibly not heard of the saxophone, it is a brass instrument equipped with keys, a mouthpiece about like a clarinet, and we add that its fingerings are quite similar to that of the flute, clarinet, oboe and bassoon. An artist playing one of these instruments has need of no more than eight days of study in order to familiarise himself with the saxophone (Hemke 1975: 276).

Expertise on the instrument was clearly lacking in many respects as very few performers (except for the notable soloists mentioned later in this dissertation) took the time to learn and study the saxophone assiduously. Composers would usually write parts for saxophonists, but also write alternative parts for other instruments in case they could not find capable saxophonists to manage the parts for symphonic works. Frequently, this extra part writing contingency was necessary as many would-be saxophonists were incompetent due to the lack of instruction from capable and specialised teachers (Segall 2005: 278).

This dissertation concerns itself with the alto saxophone as the main concert instrument, but Sax and many others had a much broader idea of the repertory that could be played on all the of the saxophone. From the commencement of the saxophone there were many attempts to broaden the repertory to include all the other saxophones that Adolphe Sax designed. Notable examples include Demersseman's *Premier solo* and Singelée's *6e solo de concert* that were written for tenor saxophone. Singelée's *7e solo de concert* was written for baritone saxophone and his two *Fantaisies* are for soprano saxophone (Ingham 1999: 53). It is my opinion that the lack of quantity and quality in these works severely limited much of the future expansion of the classical saxophone repertory to the alto saxophone. Although notable exceptions do exist, like the Villa-Lobos *Fantasia* (1948) for soprano saxophone, there are not many original works of

high quality which suit the tone of the tenor and baritone to gain a presence in the concert saxophone repertory. Hopefully, in the near future the repertoire for these instruments can expand, but the trend has mostly been to write for the alto saxophone regarding the classical music repertory, since research has so far shown the instrument to be the preferred solo instrument.

Although a work by Demersseman, *Fantaisie sur un thème originale* (1860), is the main focus of this repertory section of the study, it is worth noting that Singelée's compositions also provide interesting information on how the saxophone was utilised in its early days. In Jean-Baptiste Singelée's *Concertino Op. 78*, there are clear indications of *ossia* parts that usually display a melodic idea in the lower register for more intermediate players. It seems as if the higher register posed problems on the saxophone as well as the register changes over the break (the dual-octave mechanism making this even more difficult). The management of chromatic lines, quick register changes and high notes appear to have been the domain of more advanced players. There is also no use of notes lower than bottom D in this piece.

The initial concept of saxophone tone must first be addressed in order to understand what composers and critics thought of the instrument. Berlioz, after hearing Souallé (discussed later in this dissertation) in what was considered the first true solo performance of the saxophone, wrote in the 13 April 1851 issue of the *Journal des débats*:

The instrument possesses incomparable and expressive qualities; the trueness and beauty of a sound which can only be produced when one really masters the technique are such that it can, in slow pieces, challenge the finest singers (Hemke 1975: 345).

The saxophone was for composers more an instrument of lyrical beauty than one that could display virtuosity. Ronkin writes in his Ph.D. thesis:

It should be remembered that early reviews of saxophone performance concentrated on the instrument's fluid tone colour and rarely mentioned feats of technical trainings or high note acrobatics (Ronkin 1987: 61).

Even Franz Liszt was exposed to the saxophone when the invention was still in its infant stages. He wrote to his friend, Joseph Joachim:

Sax produced for our benefit the next day, his large family of saxophones, saxhorns, saxotubas, etc. Several of these (especially the alto and tenor saxophones) will be exceedingly useful, even in our regular orchestras and the ensemble has a really magnificent effect (Hemke 1975: 296).

With the praise of many composers and auspicious beginnings in some respect, the saxophone seemed to gain a popularity that was usually reserved for instruments of a much older heritage. Despite the fame and laudations of composers it was still not frequently used in the already established orchestras of Europe. The novel instrument ultimately required performers of commendable artistic merit and repertory worthy of its new status (Noyes 2000: 13-15).

It was clear that the instrument would flourish as a solo instrument, but unfortunately it suffered from a lack of instruction and interest from music schools in Europe in the late 19th century. This lack of instruction is one of the reasons that it could not become an orchestral woodwind like the flute, oboe and clarinet which already had formalised instruction in tertiary institutions. The perception of the saxophone as an orchestral instrument was therefore irrevocably damaged (Ferraro 2012: 36). Douglas Masek, an esteemed saxophone player from the Los Angeles area, believes that this absence of first-rate players of the instrument directly affected the quality of work that was produced in the initial stages of saxophone repertory development (Meyer 2005).

Evidence suggests that composers of symphonic music the late 19th century favoured lower notes on the saxophone and the dynamic indication for these notes was *pianissimo*. To play softly in the lower range has always been a problem for conical instruments and the first saxophones that were created appeared to have had trouble managing the low tessitura. Add to this acoustical problem that most saxophonists were relatively unskilled, and the result was that the saxophone part is rewritten for another instrument and instrumentalist who play the part at the required volume. For clarinetists this lower register presented no problem and the parts could easily be rewritten for them (Ingham 1999: 102).

A work from Demersseman, *Fantaisie sur un thème originale* (1860) will now be analysed as it is a major work in the saxophone repertory and it also illustrates some of the capabilities of the instrument of the time.

2.4 Analysis of Demersseman's *Fantaisie sur un thème originale* (1860)

Jules Demersseman was born on January 9, 1833 in Hondschoote, a small town in the north of France now quite close to the Belgian border. He had a reputation as flute virtuoso, having won prizes at the Paris Conservatory in his first few years of study. Demersseman had a short yet illustrious career as a pedagogue and soloist. He often favoured performing his own compositions at concerts. Demersseman was innovative in his compositions for the saxophone, but derided the Boehm-system flute and was a staunch traditionalist in terms of flute design. Despite his contempt for the modern innovation of the Boehm-system flute he is generally regarded as a forward thinking composer for his era (Goldberg 1987: 20).

In this piece, he displays a thorough understanding of the instrument in revealing its ability to handle both melodic and frenetic technical passages with ease, like any able flautist of the era. Bars 15 to 29 indicate an understanding of the saxophone as a melodic instrument capable of conveying deep emotion. Indicative of this would be the musical expression texts to be found in the sheet music: *dolce*, *con espr.*, and *passionate*. In contrast bars 36 to 39 have slightly more chromatic movement and virtuoso style akin to the prolific flute compositions of Demersseman that were written as *solos de concours* pieces for the Paris Conservatory (Toff 2012: 246). The saxophone is utilised in the same manner as a flute of that era with regards to fast chromatic passages. From this piece it is clear that Demersseman thought that the saxophone was on par with the virtuoso capacities of the flute of the time.

Bars 15 to 29 (Demersseman 1988)

Allegro ♩ = 120

14 A

p dolce

17 *con espr.*

21 *cresc.* *mf*

24

27 *f passionato* *f* *rall.*

Bars 36 to 39 (Demersseman 1988)

36 *mp* *mf*

38 *f* *ff*

Jules Demersseman's *Fantaisie sur un theme originale* (1860) exhibits evidence that the altissimo register was used very early. In the cadenza, he wrote altissimo F # for the alto saxophone. Previous research has shown that this did not exist mechanically at that point in time; however some players were able to achieve altissimo notes on their saxophones through

mastery of the natural harmonics of the saxophone and special fingerings. The elaborate melodic lines display that there is a clear attempt to utilise the saxophone as a virtuoso instrument, and a considerable number of chromatic runs are present in the composition. The range of the composition shows limited use of the bottom register of the instrument. It was common in the early repertoire for the saxophone that the range did not usually go lower than B below the treble stave and not higher than F above the stave. Standard opera aria transcriptions for saxophone exhibit and light classical pieces exhibit the same limited utilisation of the saxophone's range (Noyes 2000: 119).

Cadenza (bar 50) (Demersseman 1988)



Bar 48 of the *Fantasia sur un theme originale* shows that the first mouthpieces, reeds and more importantly, the players were capable of double tonguing, and Demersseman certainly wanted to utilise this in his opus. Already, within the first two decades of the saxophone's creation, there were efforts to broaden the technique above and beyond conventional playing. Again, this double tonguing technique is common for flautists (Teal 1969: 95).

Bar 48 (Double tonguing) (Demersseman 1988)



Excerpts from this piece illustrate that a prodigious technique on the saxophone is required. These examples can be found in bar 102-108, 144-148 and 154-158.

Bars 102-108 (Demersseman 1988)

Musical score for bars 102-108. The score is written in treble clef with a key signature of one sharp (F#).
Bar 102: Treble clef, F# key signature. Contains a sixteenth-note triplet, followed by eighth-note pairs with accents, and a sixteenth-note triplet. A fermata is placed over the final note.
Bar 106: Treble clef, F# key signature. Contains eighth-note pairs with accents, followed by a sixteenth-note triplet, and another eighth-note pair with an accent.
Bar 109: Treble clef, F# key signature. Starts with a sixteenth-note triplet, followed by a whole rest. A box containing the letter 'G' is positioned above the staff. A large number '9' is written below the staff. The bar ends with a double bar line. The next bar begins with a common time signature 'C', a piano dynamic 'p', and a quarter-note triplet with an accent. The word 'Tempo' is written above the staff.

Bars 144- 148 (Demersseman 1988)

Musical score for bars 144-148. The score is written in treble clef with a key signature of one sharp (F#) and a 2/4 time signature.
Bar 144: Treble clef, F# key signature, 2/4 time signature. Starts with a box containing the letter 'L' above the staff, followed by a quarter note. The dynamic is *mf*. The rest of the bar consists of eighth-note pairs with accents.
Bar 146: Treble clef, F# key signature, 2/4 time signature. Continues with eighth-note pairs with accents. The bar ends with a *cresc.* marking.

Bars 154-158 (Demersseman 1988)

Musical score for bars 154-158. The score is written in treble clef with a key signature of one sharp (F#).
Bar 154: Treble clef, F# key signature. Starts with the tempo marking 'Presto' above the staff. The bar contains a series of eighth notes with a slur over the first four notes.
Bar 156: Treble clef, F# key signature. Continues with eighth notes, featuring slurs over groups of four notes.

It can be argued that this *Fantaisie sur un thème originale* (1860) was one of the few pieces of the era that challenged the capabilities of the saxophone and of the players of the era. Most importantly, the piece is challenging, because of the finger dexterity it demands and the altissimo register that is used. The latter could not have been easy as F# keys were not available on Adolphe Sax instruments. It was not common practice to install this key on most saxophones until the 1960s (Pinksterboer 2007: 60).

2.5 Early saxophone soloists

Even in the infant stages of saxophone history there were many notable soloists that made it their goal to expose the world to the saxophone. These soloists did not just market the instrument to the wider public but also modified the existing instruments in their possession. Their technical modifications on their own instruments were later used by manufacturers to produce new saxophone prototypes. Their efforts contributed to the repertoire and the survival of the saxophone as an instrument suitable to the concert hall and various schools of playing. Their efforts involved both writing and performing the repertoire for the saxophone, and modifying the technical aspects of the instrument to suit their needs.

Louis Adolphe Mayeur deserves special mention as he was most closely associated with Adolphe Sax and the Parisian music scene of the era. He was instructed on the saxophone by Adolphe Sax and initially he popularised the saxophone to a wider audience by playing melodies from popular operas. He was also one of the first soloists to feature the saxophone in the French military bands. He was unfortunately overlooked as a composer although he composed 371 pieces (most of which include the saxophone in a military band context). He was also one of the first students to receive instruction on the saxophone at the Paris Conservatory (Greenwood 2005:1).

An interesting soloist was Jean-Baptiste Souallé, who was a clarinet student at the Paris Conservatory and won a first prize in 1844. In documented history, he is the first saxophonist to have altered the initial key system of the saxophone by replacing the double octave mechanism with a single octave mechanism. He cleverly dubbed this instrument the turcophone which was said to have a soft and suave tone that the audiences felt particularly attracted to. This

fingering concept was seen in many countries as he was an avid traveller. He performed in numerous countries and cities: Australia, New Zealand, Manila, Canton, Macau, Shanghai, Calcutta, Reunion and the Cape and Natal in South Africa. Soon many people across the world were captivated by the design of his instrument (Segall 2005: 24).

Another clarinettist, Edward (known in France as Edouard) A. Lefebre was quick to gain interest in the new instrument and made it his life mission to promote the instrument around the world. He was the first to start a music store in Cape Town in 1859 from where he sold saxophones to South African dignitaries and to enthusiastic seamen on their way to the Far East. His true ascension to fame would only occur when he promoted American concert band music, alongside Patrick Gilmore. His virtuoso ability made him receive the moniker of “Saxophone King”. He was responsible for establishing the rudiments of a saxophone quartet and transcribed hundreds of pieces of concert music that circulated throughout America and Canada (Segall 2005: 25). According to Noyes, Lefebre also helped the American instrument makers to produce saxophones by the late 19th century. Up until that time the only saxophones that were manufactured were in France (Noyes 2000a: 3). This is a topic that is relevant to the next chapter of this dissertation.

The Belgian-born, Henri Wuille was a contemporary of Sax and he quickly became one of the great advocates of the saxophone from its inception. He was one the first performers on the instrument to perform concerts in both the United States and England (Ingham 1999: 37). Henri Wuille did much to promote and teach the early repertoire of the saxophone when he started teaching at the Conservatory in Strasbourg (Ingham 1999: 13). The performances of Wuille were routinely praised and he was an avid supporter of the saxophone (Hester 1995: 15). Henri Wuille is also praised as the first saxophonist of any calibre to perform in the United States. The grand debut of the instrument on American soil was in a concert of 18 December 1853. The piece that was played was called the *Santa Claus Symphony* and it was composed by William Henry Fry (Beeson 2011: 2).

Elise Boyer Hall did much to improve the standing of the instrument with classical music critics in the United States and is commonly seen as the first concert saxophonist to promote the

instrument. After attending a concert by Elise Hall, where she played *Panis Angelicus* from Franck's Mass on tenor saxophone, a critic Philip Hale wrote:

It is a pity that the literature of this peculiarly impressive instrument is not larger... for this Instrument is something more than the plaything of a clarinettist and should be nobly, not flippantly played (Segall 2005: 244).

More of Hall's contributions to the repertory are discussed in the chapter that deals with the repertory and development from 1900-1930.

2.6 The relation of repertory to technological development from 1850-1900

This part of the dissertation will now voice my opinions (that were deduced from the academic sources) to summarise how the technology and repertory relate during the first period of 1850-1900.

Pieces like the *Fantaisie sur un thème originale* (1860) show that the saxophone repertory was becoming more demanding and composers like Demersseman wanted to write music that was suitable for a virtuoso to play. This was in direct contrast to what was written during his time for the saxophone as others wanted to play popular melodies on the instrument, like opera arias. The piece, *Fantaisie sur un thème originale* (1860) most likely epitomises the maximum capabilities that were required for the saxophones and saxophonists of the era.

However, this was no facile matter. From the saxophones and technology that were studied it is clear that the instrument had not yet reached a state where it was comfortable to play (even though it was perceived by some as being an easy instrument to master). A better and more ergonomic design and key layout needed to be invented if the saxophonist were to gain true flexibility in managing rapid arpeggios and chromatic scales. This led to the creation of the *bis* key and side key C. Furthermore, the most important innovation was to remove the double octave key system as this was somewhat cumbersome to play, and it is no wonder that a master like Souallé removed the mechanism. Add to this somewhat awkward key layout design the fact that that no rollers existed on most of the saxophones of the era, and the result is an instrument that can be unwieldy with fast chromatic and arpeggio intensive passages across the range.

The top-tone register, or altissimo register was a definite possibility, but it seems that the instruments of the time made it difficult for the player to produce overtones, due to their acoustic design that favoured the lower and middle ranges. Even Arno Bornkamp, a world-class classical saxophonist of this era had difficulties in reaching the F# in the altissimo register in his recording of the *Fantaisie sur un thème originale* (1860) on an original Adolphe Sax instrument and mouthpiece (Bornkamp 2001). In bar 50 of the piece he omits playing the high F# in the cadenza. Altissimo was a probability as there was some instruction on the topic (led by all accounts by the inventor, Adolphe Sax), but the instrument's design still needed improvement to help players achieve this register.

The Adolphe Sax saxophone's construction and design also did not favour volume as did the saxophones of later eras. The tone holes were also not as big as those of later models and this severely limited the volume that the first few saxophones could achieve. Therefore, these Adolphe Sax era instruments are known for their soft, lyrical quality and it perfectly matches the descriptions of Kastner and Berlioz in the previous sections.

The saxophone would find a new home in America by the dawn of the 20th century. The next chapter investigates this pivotal era of saxophone development.

Chapter 3 Saxophone repertory and development from 1900-1930: popularisation and controversy

By the early twentieth century the saxophone had become a more popular instrument on the North American continent as the instrument found a place in the American concert bands with John Philip Sousa and Patrick Gilmore. No less than ten saxophonists performed with the Sousa Band in the period 1892-1932 with players like Benne Henton and Harold Stephens headlining shows. The countrywide tours of the Sousa band promoted the saxophone to the public all over the United States. These concert bands became patriotic icons and found appeal with the masses (Hester 1995: 1).

Unfortunately, the saxophone had by the early twentieth century also gained a notorious reputation. A newspaper article from 1917 laments the existence of the saxophone in an article entitled, *The Saxophone: Siren of Satan*:

No other musical instrument can be so immoral. The saxophone is guttural, savage, panting and low in its appeal. The abstract immorality of the saxophone is but an example of the power that gilded sin has for the moment over thoughtless minds. Some severe action must sooner or later be taken upon the matter of our dance music and measures enforced prohibiting the use of the saxophone in this connection or compelling musicians to play it in another fashion (Evans 2013:3).

The saxophone was further condemned by moralists in the *Ladies Home Journal* in the 1920s and many articles were written deriding the instrument as an instigator of immorality in the jazz and dance band craze which to their minds were corrupting American society. The saxophone was also called “the scapegoat for all the evils attached to jazz dancing.” Even authorities in the Vatican, led by Pope Pius X disapproved strongly of the use of wind instruments with the saxophone being singled out by a papal decree in 1914. Strangely, this papal decree has not yet been rescinded (Evans 2013:3).

The governmental authorities in the United States were also outraged by the effect of the saxophone and supported its connotation to immorality. A police sergeant from Washington stated in an interview with the *New York Times* that “any music played on the saxophone is immoral.” He also claimed that saxophones were “murdering the peace” of his community.

Finally, the police sergeant concluded by saying “one would think that the serpent wooed Eve with a saxophone” (Knowles 2009: 164).

3.1 The contribution of American manufacturers in the “Saxophone Craze”

Edward A. Lefebre made substantial contributions to the saxophone manufacturing companies in America. The first saxophone that was made in the United States was built in about 1890 with the financial backing of C.G. Conn and the technical and musical expertise of Lefebre. Another future entrepreneur Ferdinand August Buescher also worked at the Conn factory and opened his own company called the Buescher Manufacturing Company in 1894. It was during this era of experimentation that American manufacturers like C.G. Conn and Buescher surpassed their older European counterparts (Noyes 2000a: 123). Paul Bro, who is an expert on American saxophone design, commented in the following fashion on how the American companies became competition for the established European manufacturers:

Monsieur Lefebre entered the Conn Factories in 1890, where he took up serious experimental work in the effort to improve the mechanism, intonation and tone of the saxophone. The results placed the Conn saxophones on the highest pinnacle of perfection reached at that time and in consequence the Conn Saxophone became world famous and the European saxophone artists were compelled to admit their superiority over all saxophones built in their own country (Bro 1992: 63).

In the initial stages manufacturers like C.G. Conn sought to make American saxophones that would be much better in terms of quality and price. Most American-based saxophonists, like Lefebre had to pay \$150 with import taxes for a professional instrument from Paris, but a better instrument from C.G. Conn could be bought for only \$100. This reduction in price and increase in quality made it possible for American manufacturers to gain superiority above their European equivalents (Noyes 2003:124). The *New York Tribune* published an article that described the goals of C.G. Conn. The following paragraph illustrates how C.G. Conn wanted to revolutionise an industry:

Saxophone players are familiar and often dismayed at the defects of the ordinary cheap European saxophones and it is Mr. Conn’s intention to place within the reach of musicians a saxophone at a moderate price which shall be as superior to the imported

saxophones as the Wonder Clarinets are to the French and German clarinets and as it is well known the Wonder Cornets are (superior) to all other cornets (Bro 1992:65).

Despite the high prices involved in European-made saxophones there were also many other factors that prohibited the saxophone from popular use. The early saxophone was known for its inconsistent intonation, its awkward and unreliable mechanisms and the finish was unrefined; this made the instrument complicated and frustrating to learn. With the innovations of the C.G. Conn factory, amateurs and professionals alike switched to the Conn Wonder saxophone as it was believed to have superior intonation, reliability and an attractive finish. By the end of the century, notable promoters of the saxophone had switched to the Conn Wonder saxophone. The Conn Wonder saxophone was followed by another model called the Conn New Wonder. These instruments were produced from the 1920 till 1929 by the C.G. Conn Company and these instruments are still renowned for their sound that was described as mellow, but powerful. Lefebvre, himself always complained about the deficiencies in his Buffet-Crampon saxophone from France and switched to the Conn models which he tested and designed at the C.G. Conn factory (Noyes 2000a: 130-144).

The C.G. Conn Company was known to aid music education in schools in the United States in the early 20th century and the band programs in schools would soon help the saxophone to be promoted to a younger, enthusiastic audience. Conn established the Chicago School of Music in 1903 and its graduates became teachers and instrument salesmen throughout the entire Midwest. It is no coincidence that Indiana, Michigan, Ohio, Iowa and Illinois became important music education centres for saxophone students in America. An entire infrastructure of instrument teaching and manufacturing was set-up that would support the “Saxophone Craze” of 1915-1930. Conn had started a musical curriculum that would influence the rest of the world in a few years and this frequently involved the young student of the saxophone playing in the school band from their first lesson. 45 patents were granted by the United States Patent Office to the C.G. Conn Company and C.G. Conn made substantial improvements to the saxophone’s design (Segall 2005: 166).

By the 1920s many techniques in instrument manufacturing had improved. The greatest improvement was electric motors replacing the old belt-drive equipment, thereby making the saxophone production a massive industry. The different parts of the body were all made separately and then soldered together. The different parts were mainly hand-made and tone holes were drilled at pre-determined positions by precise machinery. Rigid testing ensured that a company like Buescher could produce remarkable saxophones at an affordable price in a time when the Saxophone Craze was at its zenith (Saxquest Shop 2012).

Manufacturers were also quick to reintroduce a saxophone that was pitched in C. For the public this saxophone became known as the C Melody saxophone. The tone that the instrument could produce was closer to the Bb tenor saxophone than the Eb alto saxophone and this theoretically added a warmer sound to the instrument. The idea was to make an instrument that would be easily for amateurs to learn sheet music from other instruments as no transposition was necessary for this saxophone. For many musicians the sound was too uneven and it lacked the sharp focus of the alto saxophone and also the authority of the tenor saxophone. Cecil Leeson, a future saxophone virtuoso admired the rich tone of Wiedoeft's lower register on his recording, but Leeson was dismayed when he heard Wiedoeft play a live performance on the C Melody saxophone. It was not long before the new brand of concert saxophonists, like Leeson and Teal would not favour the instrument and the C Melody was relegated. Inevitably the instrument's fame was short lived as neither mainstream classical saxophonists nor dance band orchestras would use the instrument from the 1930s onward (Segall 2005: 74).

Saxophone manufacturers of this era also had to compete with the rising demand of the public. They had to change some of their manufacturing methods to bring down the price of their instruments. Pearson believes that a company like Martin did not anneal brass, but still followed the traditional method of tempering. Every other saxophone manufacturer utilised brass annealing methods by the 1930s, but the Martin Band Instrument Company resumed the process of only tempering the brass and soldering on the tone sockets of their saxophones even

as conventional wisdom deemed this method inferior. It was mistakenly believed that this led to leaks on the instruments. The tempering process was of course expensive and time-consuming, but many players of today assert that the brass tempering method of Martin led to the instrument having superior response and ease of playing (Pearson 2011: 11-12).

Some experts would call the experiments of manufacturers to craft mouthpieces with square chambers in the 1920s as being misguided. The idea was to create a mouthpiece that would project more in the context of the jazz band. An expert like Ralph Morgan (who designs and improves contemporary mouthpieces) believes that the interior square of the mouthpiece immediately changes the volume of the instrument. The acoustic construction of the saxophone does not favour square mouthpieces as the dimensions of such a mouthpiece leads to deficiencies in intonation. The brighter sound does not equal projection as some believe, and as a consequence of the square mouthpiece the higher harmonic partials sound thin and very sharp. Clearly, efforts were made to make the instrument louder and bolder in tone, but this sacrificed intonation accuracy considerably (Segall 2005: 174). Others, in contrast to Morgan, believe that the difficulties in the square mouthpieces could easily be overcome by a change in embouchure with loosened tension on the lower jaw and a more open throat cavity. This also explains how many players could gain an extra weight of sound during this era (Ingham 1999:89).

In the 1920s, the European manufacturers were producing far fewer saxophones as their American counterparts like Conn and Buescher. The Modele 22 from Selmer is a good example of the differences in manufacturing and instrument design concept. The European saxophones from this era were still modelled on the Adolphe Sax principles, but had made efforts to install a low Bb, a high F and roller keys. Numerous differences can be seen on the Modele 22 when compared to American saxophones: the keys were drop forged rather than cast, the low bell keys (low B and Bb) were on one side of the bell and the key action was closer and lighter on the Modele 22 than the American saxophones of this time. The Buffet saxophones tended to have better intonation than the Selmer instruments of the time and were constructed better,

but could not compete with the American companies. American manufacturers produced more durable instruments than their French counterparts during this era and therefore the European manufacturers struggled to compete (Cohen 1997: 25).

In an attempt to challenge the Buescher Company's dominance, Buffet patented what was called the Apogée system. This system featured a double key for the low B, and double keys for the production of G# as well as D. The idea behind the double keys for the G# and the D was to make trills on these notes easier for the player. Notably, instruments designed with this system permitted the production of low C, B and Bb with only the left little finger. The Apogée system was invented chiefly to make the playing of the chromatic scale easier, but most believe the addition of an extra Eb key to have created some intonation problems, and the system was discarded (Evette 1911).

The superiority of Buescher instruments of this era can be attributed to their patented "Snap-on Pad" system. These pads were able to stay in the correct position (flat and taut) for longer than the older pads, and the quality resonators on these pads aided the volume of the instrument. The saxophones that were equipped with the "Snap-on Pad" system were brighter, projected more and carried much more volume as a result of this innovation. Some necks (crooks) were also improved in this era and many Buescher enthusiasts claim that these necks aided the player in producing the altissimo register with very little trouble. No soldering occurred on the Buescher tone holes during this era as it was seen as ineffective (due to the acids in saliva inevitably damaging the soldered tone holes) and time consuming (extra employees were needed to solder and execute the process). Instead the Buescher Company devised a system where holes were drawn on the brass tube and then given a level-milled edge that would not cut the saxophone's pads (Cohen 1997:8).

By the end of the 1920s the Buescher Company advertised that it had "perfected" other aspects of the saxophone's design. Most of the saxophones that were built came equipped with a special key for the high F and a new octave key was introduced that eliminated the superfluous

posts and springs of earlier designs. Fast passages in the lower register could be managed more easily, because the spatula keys were now closer together (The low Bb key was in a position directly below the B and G# keys) (Wall 1931: 5).

Ferdinand Buescher was assured that American manufacturers were clearly superior to their French counterparts. In 1925, the French government decided to deport all American dance bands in France there was clear protest on the American side as it would have damaged the livelihoods of touring American musicians. The conservative French government believed these jazz bands of the time to be instigators of immorality and disturbers of the peace. The French government, it would seem did not at first like the notion of American jazz music. The telegram that Ferdinand Buescher sent to the American ambassador in France read thus:

As the largest manufacturer of saxophones in the world and as an American citizen, I wish to add my protest to that of Paul Specht and American musicians regarding the actions of the French government in banning American Dance Orchestras. A Frenchman invented our national instrument, though we perfected it. Surely, there is work and glory enough for both Frenchman and American? Can you not intercede on behalf of our (American) musicians in France? (Koenig 2002: 345)

3.2 The impact of jazz and popular music on saxophone perception

The saxophone became an important addition to the American concert band due to the efforts of Edward A. Lefebre who played solo work on it as well as John Philip Sousa and Patrick Gilmore that utilised the timbre of the instrument for their bands. The saxophone quickly influenced other styles of music of the time. This includes usage in minstrel, vaudeville, circuses, Chautauqua and lyceum shows. Most importantly this widespread use was also influencing dance orchestras to use the instrument, with Buescher saxophones being a favoured brand (Segall 2005: 55). In the early days of the jazz ensemble the instrumentation usually consisted of trumpet, clarinet, trombone, bass and drums. Very few photographs show the existence of the saxophone in jazz ensembles before 1915. The instrument only gained a more permanent position in the jazz ensemble after World War I due to changing music tastes and the need for more volume in the jazz ensemble (Ingham 1999:18). The saxophone gaining

prominence in the jazz field can be attributed to Sidney Bechet and Coleman Hawkins (Kirchner 2005: 600-601).

The origins of saxophone popularity were not in jazz, but in the burgeoning vaudeville, minstrel and circus scenes of the time. The following few paragraphs illustrates this.

Due to the expertise of manufacturers the saxophone was quickly becoming widely available to the general public. This indirectly led to the formation of a musical group called the Brown Brothers. The Brown Brothers was in essence a novelty act that became popular with the touring circuses of the United States. The musicians in the Brown Brothers rubbed burnt cork on their faces, supposedly referring to the African-American music that the group played. The Brown Brothers became commercially successful and started to headline at most of the circus events that they played and had numerous popular hits, like *Bullfrog Blues* and *Chicken Walk* (Evans 2013). Unfortunately this novelty act did much to tarnish the reputation of the saxophone as an instrument worthy of art music and the image that the public had of the instrument:

Although they (the Six Brown Brothers) did much to demonstrate the saxophone's humorous personality to wide audiences, they also contributed to its reputation as a lowbrow instrument, suited to imitating the braying of donkeys, laughing hyenas, a flatulent dowager, and the roar of an approaching locomotive. In a business in which a family of seals playing "My Country 'Tis of Thee" on batteries of horns was thought to be wildly hilarious, they were advancing a certain ignoble tradition (Segall 2005: 65).

The vaudeville connotations of the saxophone did not stop with the Brown Brothers and many people took advantage of this perception to make easy money on the vaudeville circuit. In this genre there seemed to be no standard that was expected by audiences as the novel image of the saxophone was more important to audiences than the need to be proficient on the instrument. Hester writes after an interview with Dr. Larry Teal about the abuse of the saxophone in vaudeville culture by amateurs:

From 1915-1919, it was possible that a typical saxophonist might have purchased an instrument on Thursday and by Saturday that same week made 35

cents on a vaudeville stage. The requirements for securing work as a saxophonist were low because there were almost no examples of what the instrument was capable of (Hester 1995: 15).

Another famous soloist emerged from this era was known as Rudy Wiedoeft, who became a celebrity in the United States during the 1920s. He was also one of the first saxophonists to make any saxophone recordings that warrant historical merit. The compositions that made him famous were *Saxophobia*, *Valse Vanité*, *Valse Erica* and *Dans l'Orient*. Rudy Wiedoeft was also one of the first saxophonists to perform in a live broadcast on radio. This historic broadcast occurred at the New York Aeolian Hall in New York on the 17 April, 1926. Wiedoeft inspired many saxophonists of the time as he had a very smooth way of transitioning between notes and he could employ extended techniques like growls, slap- and double-tonguing. The popularity of his playing and his own brand of ragtime displayed virtuosity on the saxophone that was not frequently heard or seen in public (Robbery 1989: 71-73). Rudy Wiedoeft inspired a generation of saxophone players to explore the dynamic capabilities of the instrument as well as effects like pitch bends, clean and rapid series of notes and flutter-tonguing. Wiedoeft would frequently perform in a cowboy suit adding to the novelty status of the saxophone at the time (Segall 2005:75).

By the early 1900s many amateur ensembles existed in the United States and by 1920 many of these consisted chiefly of unprofessional saxophone players that were enthusiastic about the instrument. This led to many of the other instruments that amateurs could play being abandoned in favour of ensembles that could consist of four to a hundred saxophones. Instrument manufacturers, like C.G. Conn were struggling to keep up with the incredible demand for new instruments. The extent of this rising popularity of the instrument was truly astounding. For example, the Chicago Health Department Saxophone Band was organised for the health and well-being of employees and even the Joliet, Illinois prison had an ensemble consisting only of saxophones (Segall 2005:41).

There were efforts to counter this mass-popularisation and the novelty act status of the saxophone. Smith and Holmes were prominent exponents of this movement. They thought that the growing popularity of the saxophone had meant that the instrument was being played poorly by mainly amateurs and was prohibiting the instrument from achieving a higher musical calling. Holmes industriously set out to create a saxophone act that was sophisticated for the audiences of the time and he wrote more saxophone quartet compositions for the instruments than anyone else. Smith wrote for a publication, *Dominant*, which was intended as a publication for amateur musicians, and avidly condemned dance and jazz music. Smith and Holmes wrote that “the Jasser (early spelling of the colloquial word “jazz”) should be subject to the same quarantine restrictions as if he had foot and mouth disease” (Segall 2005: 69).

3.3 The slow expansion of the classical repertory: 1900-1930

Worldwide, there were only a few instances where notable composers of the era thought that it was possible to write in the classical idiom for the instrument. While the instrument flourished with amateurs and in early jazz and dance bands, it was suffering in the concert hall. Debussy was one of the few composers who made an effort to improve the stature and scope of the instrument (Ingham 1999: 53). His *Rapsodie Mauresque pour orchestre et saxophone alto* (1901) will later be discussed.

The continued expansions of the repertory, albeit at a slow rate, were largely due to the efforts of Elise Boyer Hall. With large financial resources she could commission works for composers such as André Caplet, Phillippe Gaubert, Charles Martin Loeffler, Georges Longy and Florent Schmitt. Other notable works that Hall premiered are *Legend* for saxophone and orchestra by Georges Sprok in 1906 and Henri Woollett's *Siberia - Poeme Symphonique* in 1911 (Ingham 1999: 53).

Although the repertory for the serious and less jazz-orientated saxophonist was not evolving at a rapid rate it is certainly worth mentioning that there were players becoming more adept at producing top-tones on the saxophone. Benne Henton and Jascha Gurewich were players in this

era who illustrated the capabilities of the saxophone above the two-and-a-half octave range in the concert band environment (Segall 2005:68).

In Europe, the instrument was also trying to gain some kind of foothold in the concert hall. Three notable works deserve mention. Sir William Walton's *Façade* was composed in 1922 and it remains his most famous work according to Ingham. 21 poems by Edith Sitwell are accompanied by a small chamber ensemble consisting mainly of wind instruments. The jazz rhythms of this piece capture the *zeitgeist* of this era. Paul Hindemith experimented in using the instrument in his *Trio, Op.47*. The work features the somewhat unusual instrumentation of viola, tenor saxophone and piano. The tenor saxophone part is not as challenging as the viola and piano part, but it shows that a major composer from this era was at least interested in using the instrument. Later in the 1930s he wrote the Hindemith *Sonata for Alto Saxophone and Piano*, an important saxophone work of the classical saxophone literature (Ingham 1999: 54).

3.4 Analysis of Debussy's *Rapsodie Mauresque pour orchestre et saxophone alto* (1901)

Debussy's *Rapsodie Mauresque pour orchestre et saxophone alto* was influenced by works of Edgar Allan Poe and this particular work draws inspiration from the melancholy nature of his literature. Dukas even suggested that Debussy was influenced more by the famous persons in literature than by musicians. The work was commissioned by Elise Boyer Hall, an enthusiastic amateur from Boston. Hall is also lauded as America's first concert saxophonist and she could commission works quite easily as her husband was wealthy and supportive enough to pay for such artistic ventures. According to Noyes, the work tells a mournful tale, representing the saxophone's exclusion from the symphony orchestra, desperately seeking acceptance from an already well-established musical format (Noyes 2006b.: 2).

Claude Debussy's *Rapsodie Mauresque pour orchestre et saxophone alto* is considered to be one of the very important works for the saxophone in this era although it is one of his more sombre compositions. Debussy believed, in his words that the saxophone is to be considered an "aquatic" instrument, which probably means that he likened the shape of the saxophone to a sea horse (Segall 2005: 244). It is evident that Debussy was unsure of the instrument's qualities

and how to write a piece that would be idiomatic for the saxophone. The following quote comes from a letter to his friend, Pierre Louys:

The saxophone is a reed animal whose habits I hardly know. It is in love with the romantic mellifluousness of the clarinets, or rather the clumsy irony of the sarrusophone (or contrabassoon)? At any rate, I shall have it murmur melancholy phrases to the accompaniment of a side-drum (Noyes 2006b:3).³

The composition illustrates many subtle aspects of the saxophone of the era and it displays how a major composer could utilise the instrument to expand the tonal colour in his works. The exact date that the composition was written is unsure, but documents show that his earliest attempts started in 1901. The work encompasses two principal sections, and it has easily recognisable themes that are treated in a free, fantasia-like manner, and the vivid Spanish rhythms reflect the original title of the piece (Ingham 1999 53).

The saxophone introduction displays similarities, in my opinion, to the flute solo in his famous *Prelude à l'après-midi d'un faune* (1894) and is thoroughly impressionistic in concept. The exotic melody perfectly conveys the forlorn tone of the saxophone in this instance:

(Debussy 2010)

The image shows a musical score for saxophone in 2/4 time. The first staff begins with the instruction *ad lib.* and a dynamic marking of *p* (piano). It features a melodic line with several triplet markings (indicated by a '3' above the notes). The second staff starts at measure 5, marked with *cresc.* (crescendo) and *Un peu ralenti* (slightly slower). This section consists of a more rhythmic, triplet-based pattern. The score is written on a single treble clef staff.

The scales that Debussy utilises in the score are also of an exotic and arabesque nature. This suggests that Debussy believed the instrument perfectly capable and flexible enough to handle complicated musical material with ease. The composition is also seen as one of his most

³ Perhaps Debussy is exhibiting a false modesty here. At the very least, Debussy evaluated the saxophone's capabilities well enough to write a piece that was idiomatic for the instrument.

adventurous and colourful compositions. The next table illustrates this use of interesting and rich sonorities that Debussy present in a masterful fashion through the use of the saxophone. A harmonic analysis and investigation by Noyes shows that Debussy did use interesting modes and tonal colours. The following table was created by Noyes to illustrate the uses of modes and exotic scales in the piece (Noyes 2000b: 8).

Part of the composition	Scales utilised	Scale content
Measure 14-19 (Saxophone introduction)	D# Locrian/ D Lydian	G#, A, B, C#, D, D#, E, F#, G#
Measure 249-260, 286, 290 (Orchestra and saxophone climax)	G Neapolitan minor/ C Hungarian Gypsy	G, Ab, Bb, C, D, Eb, F#, G
Measure 374-382 (Orchestra and saxophone finale)	E Mixolydian/ F# natural minor/ A major	E, F#, G#, A, B, C#, D, E

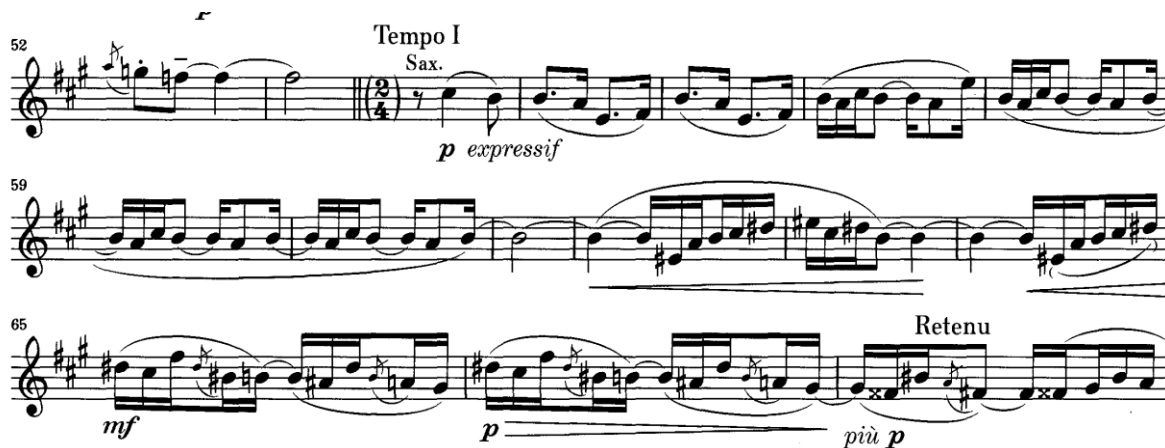
A study of the score indicates that Debussy did hesitate to use some parts of the altissimo register (as is shown in bar 120 and 314). The thematic material of the composition is enhanced by him writing precise dynamics and marks of expression. The composition also shows that he thought that the saxophone could manage difficult passages as the melodic lines that he wrote are quite difficult and he desired it to be played quickly. Overall, the composition shows that Debussy used the melancholic tone of the instrument to alluring effect as this was his concept of its sonority. Again, Debussy does not use the lower register of the instrument and the lowest note on the score is a bottom D (Debussy 2010).

Bar 314 (Debussy 2010)



Debussy wrote for the saxophone in a key that is somewhat awkward (Bb minor in the transposed saxophone part) and consistently makes use of chromatic movements and double flats and sharps as well as the grace notes that present challenges in this piece of music. The initial Bb minor tonality shifts to A major in the saxophone part and yet again more notes outside of the scale are used. A great amount of dexterity is required to manage the intricate melodic lines in the piece (Debussy 2010).

Bars 52-67



3.5 The relation of repertory to technological development from 1900-1930

A few opinions regarding the saxophone's technological development and repertory from 1900-1930 are now discussed.

It is evident that the saxophone was still in a tenuous position in art music. A major composer like Debussy had many doubts about the idiomatic utilisation of the instrument in classical music, but he did manage to explore the instrument's altissimo register and sombre sonority in accordance with his own compositional style. In his work the saxophone must manage

complex melodic lines and saxophones with a simpler fingering system needed to exist if these melodic lines were to be managed on the alto saxophones of the time. In this new design, Buescher took the leading role in improving and standardising the key layout of the respective age.

The “Saxophone Craze” fortunately contributed to improved saxophone mechanisms, intonation and durability. Saxophone manufacturers like C.G. Conn and Buescher in the United States were now becoming a dominant force in the industry, and Selmer and Buffet-Crampon were somewhat marginalised. This healthy competition to gain considerable wealth with an expanding market proved to be a big incentive for saxophone companies to consistently innovate. More and more amateurs were playing the saxophone with much enthusiasm and the once obscure instrument was being promoted to the public, which in the end was a saving grace for an instrument that had few capable promoters at the end of 19th century.

What the “Saxophone Craze” did for manufacturing techniques and the industry was not met with an equally positive response and output in the classical repertory. The notion that the saxophone was a commoner’s instrument (due mainly to vaudeville and circus spectacles) meant that it did not have a position in the more serious classical music world. As a result of this perception very few composers of note wrote works of quality that demonstrated the instrument’s capability to the art music world. By all accounts, the instrument was welcomed in vaudeville, dance bands and jazz bands, but not fervently promoted in the concert hall and in this sense the saxophone was neglected.

There were excellent players of the era that attempted to challenge public perception with Smith and Holmes being the most active forerunners of this movement for more sophisticated saxophone music. Reportedly, Jascha Gurewicz and Benne Henton could achieve accurate top-tones on their instrument with the instruments of their time.

The classical saxophone was also at odds with popular perception as few serious composers believed it to have exceptional capabilities to please a concert hall audience. In this field, a more solid foundation was needed and this would be provided by Marcel Mule and Sigurd Rascher respectively. The next chapter will now concentrate now on the major era: 1930-1950.

Chapter 4 Saxophone repertory and development from 1930-1950

4.1 International perceptions

The general concept of the classical saxophone's repertory and position in the classical world was still unconvincing in the end of the first century of the instrument's existence. The following quote, written by the lauded soloist and academic, Sigurd Rascher from 1942 exhibits what were the thoughts regarding the saxophone at the time:

A hundred years seems long in measuring a life span. But in thinking of musical history, a hundred years is not too long. The saxophone, much-maligned, unappreciated, has passed its hundredth year, and only now is beginning to be taken seriously as a musical instrument of artistic and aesthetic possibilities. Only now has the question of its acceptance into orchestral instrumentation come to the front. And even today the musical possibilities of this instrument have not been exploited fully (Rascher 1942: 8).

A small but noticeable increase in the classical saxophone and its repertory was occurring during the 1930s and 1940s. Most of the performers, like Sigurd Rascher and Marcel Mule played transcriptions of older works that showcased the saxophone's abilities. As a consequence, more composers developed a keen interest in the saxophone as an instrument for the concert hall. (Wright 2005: 5).

It is interesting that the brass sections of the 1930s and 1940s were now required to play high notes more often. This is a phenomenon that was not only present in the Big Band music of the age, but also apparent in classical music. Strauss, Stravinsky and Schoenberg required trumpet players to pitch the altissimo Eb. The Big Band players were not satisfied until they could comfortably reach the altissimo Bb (Schuller 1989: 170). This trend of attempts to make the players play in the high register would inevitably influence the works which were written for the saxophone, as is explained later in the dissertation.

Unfortunately, the saxophone was still subjected to the stereotypes and the immoral image that many moralists and right-wing activists attached to it. This led to the instrument's derision in many countries. The fascist Nazi government in Germany actively denounced jazz music as part of its policy to regulate the arts so that it could enforce its propaganda on the populace. The instrument's image (due to its association with jazz) was tarnished and the saxophone was

seen as an exponent of *Entarte Muzik* (degenerate music). Many Germans associated the African-American with jazz, and the saxophone was a symbol of music that they deemed to be decadent and inferior. The following paragraph illustrates, to a great extent, the propaganda that the Germans used to discredit the instrument by its association with black people:

Consequently, the German stereotype of a black man became that of a powerful menacing rapist, and a savage African. A 1930/31 illustration provides an example of this stereotype with a music-related theme. It depicts a muscled, shirtless black man straddling his latest conquest, a crumpled heap of traditional orchestral instruments, while beating a drum and playing a saxophone (Bell 2004:65).

The saxophone was truly a *provocateur* in countries with fascist or communist governments. With Stalin's great purge of 1937 many saxophonists were shot or exiled. The saxophone was effectively branded as the instrument of capitalists and a reminder of the tsarist past. This effectively ruled out any future for the study of classical saxophone in Russia until later communist periods. This was unfortunate, because Prokofiev and Shostakovich had done much to promote the instrument. The jazz saxophone was similarly expunged from Russian society with only a few saxophonists that still worked underground. There was a saying in Russia illustrating that jazz was anti-governmental and rebellious: "Segodnia on igraet dzhaz, a zavtra rodino prodast" (Today you play jazz, tomorrow you betray the motherland). Many adept saxophonists were forced to trade their instruments for flutes or cellos in Russia, but some still performed incognito in obscure jazz clubs that were unknown to the communist government (Segall 2005: 232).

Otherwise, academic studies of the saxophone were growing not only in France and the United States, but players in Britain, Belgium and Australia were also advancing the instrument in the concert hall. Stephen Trier and Michael Krein did much to advance the study of the repertory at the Royal College of Music and at the Guildhall School of Music and Drama in London. An independent school of saxophone, from the Belgian tradition was led by Francois Daneels. Clive Amadio had given many performances of the standard works of the classical saxophone by 1941 and he became professor at the Sydney School of Music, leading to a solid pedagogical foundation at the institution (Ingham 1999: 41).

4.2 Sigurd Rascher and Marcel Mule

Two notable soloists emerged from around the 1930s in the classical saxophone milieu. These two players were not only virtuoso players of the saxophone, but also good, confident teachers and this led to the formation of two distinct schools of saxophone playing. The two schools were known as the French school (initiated by Mule) and the German school (begun by Rascher). The German school is also known simply as the Rascher style of teaching and his pedagogical influence is widespread in the United States. This teaching style is attributed to the German school by virtue of the fact that Sigurd Rascher, although of Danish descent, lived in Germany until the Nazi regime persecuted saxophonists; as a consequence he emigrated to the United States. Many Germans like his daughter Carina Rascher-Peters later helped to make this saxophone style accessible to German schools and tertiary institutions (Ingram 1999: 41-43).

Marcel Mule was actively involved in the Parisian jazz scene of the 1920s, but he later joined the Garde Republicaine and was asked to perform at many concerts and at the opera in Paris. Mule started to establish a French school that concerned itself with specific aspects of the saxophone: embouchure, vibrato, finger technique, intonation, breathing technique, tonguing technique and sound emission. Mule was responsible for many works being commissioned for the saxophone and inspired composers like Glazunov, Milhaud and Bozza to expand the repertoire. The Paris Conservatory became aware that the saxophone had an important part to play in art music and made him the second teacher at the Conservatory; a position that had been briefly held by Adolphe Sax in the previous century. The French school of Mule persisted through the efforts of his students. These students became famous saxophonists that toured the world promoting the concert saxophone, and examples include Jean-Marie Londeix, Daniel Daffayet and Guy Lacour (Angeli 2013: 7). It is worth noting that Mule was required to play in the altissimo range, but he was not too enthusiastic about the usage of this register as he derided a lot of the saxophone music of his own time, as well as many extended techniques (Segall 2005: 238).

Sigurd Rascher lived most of his life in the United States, although he started his musical life in Germany. Rascher's move to the United States definitely contributed to advanced study of the

saxophone in that country. Rascher promoted the instrument by performing with top-class orchestras in the United States. These orchestras include the Boston Symphony Orchestra, the New York Philharmonic Orchestra, the Philadelphia Orchestra and the Cleveland Orchestra. Rascher wanted to stay as close as possible to the sound that Sax wanted for the saxophone and therefore he modelled and played on his own mouthpieces according to the proportions of Sax. Rascher, therefore was aiming to maintain the ideals of Sax whereas Mule wanted to expand those ideals by adding some of his own ideas, in particular vibrato (Angeli 2013: 8). Rascher was also a pioneer of the altissimo register and he believed the Adolphe Sax instruments to be just as capable of using the altissimo register as the Buescher saxophones of his era (Rascher 1983: 2). Many other great soloists and teachers were inspired by the pedagogy of Rascher. These include John Edward Kelly, Ronald Caravan and Lee Patrick (Ingram 1999:43).

Rascher's pedagogy has sometimes been described as "tyrannical" and doctrinal. He was rarely complimentary of other saxophonist's playing and encouraged isolationism among his students. To this day, the classical saxophone programmes at Syracuse, Louisville, New York State and Florida State Universities uphold Rascher's principles of using Adolphe Sax mouthpieces based on the design of Adolphe Sax (Segall 2005: 246).

The French and Rascher schools of playing were largely a positive influence on the saxophone's pedagogy. For the first time, players and teachers had a reference of particular playing styles with clearly defined concepts on vibrato, embouchure etc. The division has unfortunately also caused a major problem amongst classical saxophonists and it has caused many rifts in the style of interpretation of certain works. Günther Schuller laments this division in an interview with Michael Segall:

It's not surprising that people should have argued so long over how the saxophone should sound, because it was an unconventional instrument trying to fit into conventional music. That's what academics do when there is not much to fight over. Rather than address the problem-finding people who could write in new ways for the saxophone- they fell back on a convenient scapegoat: that old French-versus-German thing (Segall 2005: 245).

4.3 An expanded classical repertory for formal study

A global expansion of the repertory was indeed occurring. More interest in writing music for the saxophone started to emerge in the United States and continental Europe.

The classical saxophone repertory was expanded on the American continent by Cecil Leeson and Larry Teal. Bernard Heiden wrote what was called the “first substantive sonata for the instrument” (Ingham 1999:55). Heiden’s friendship with Larry Teal resulted in a new composition that was based largely on some of the harmonic principles of Hindemith. The harmonic structure of the sonata is primarily tonal, but there are many occurrences of modal mixtures, quartal harmonic progressions and chords that are often missing a third giving an open quintal texture. The work received much praise from critics and the public, although Hindemith wrote a mixed and critical review of the work (Beeson 2011: 7).

Paul Creston also dedicated a work to Cecil Leeson in which he wanted to demonstrate more of the capabilities of the instrument. His *Sonata Op. 19* is generally considered as “one of the definitive works for saxophone and piano” (Ingham 1999: 55). His harmonies are tonal but in some instances they suggest modal or pan-diatonic writing with the use of expanded, jazz-influenced altered ninth chords. The utilisation of parallel ninth chords and the extensive use of the Lydian mode contribute a modern jazz sound and harmony. Some usage of the altissimo register is evident in this particular work. This affords *Sonata Op.19* a distinct American sound, which the saxophone enhances in a particularly expressive fashion (Beeson 2011: 8).

The inspirational Glazunov’s *Saxophone Concerto in Eb major* (1934), written in France, deserves special mention as it is my opinion that this work is as significant as the Ibert’s *Concertino da Camera* (1935). The lyricism of Glazunov (that is seen as being on par with Tchaikovsky) is captured perfectly by the saxophone in this work. The intensely lyrical work starts with a melodious theme and ends with an extended fugato. Both Rascher and Mule performed this work and it features some use of the altissimo (Roeder 2003: 299). Glazunov was amazed at the capabilities of a virtuoso like Rascher and did not hesitate to write both difficult technical and melodic lines that would display the saxophone’s unique timbre. He could

scarcely believe that the instrument that the classical musicians played was the same as that of jazz musicians (Sobchenko 1997: 67).

In other parts Europe there was interest shown by composers Paul Hindemith, Frank Martin and Darius Milhaud. Hindemith composed two important pieces in the 1930s, his *Sonata for Alto Sax and Piano* and the *Konzertstück* for two alto saxophones. The 1938 *Ballade* by Swiss-born, Frank Martin is a powerful work that utilises the full range of the saxophone. Perhaps the most popular work to come from this era is Milhaud's *Scaramouche* that was written for Mule. The melodic work captures the lyricism of the saxophone, making it accessible to a wide audience (Ingham 1999: 56).

It must be noted that Sigurd Rascher, Marcel Mule and Cecil Leeson were initially dependent upon transcriptions, due to the scarcity of repertoire that was available at the beginning of their careers. Mule could sight-transpose with ease and he was known to perform pieces like the trumpet part from Bach's *Brandenburg Concerto no.2* and the alto flute part from Ravel's *Daphnis and Chloe*. Mule later gained fame with his twelve-concert tour of the United States, where he premiered the original works for saxophone alongside his own transcriptions of such pieces as the *Canzonetta, op.19* by Gabriel Pierné (originally for clarinet) and the *Sonata BWV 1035* (originally for flute) by J.S. Bach (Etheridge 2008:14).

4.4 Radical changes in saxophone design and manufacturing techniques

The 1930s was a period when many classical saxophonists benefited from major mechanical experimentation on the saxophone. The Wall Street crash led to saxophone manufacturers making less profit from saxophone sales. Mechanical improvements had to be made in order to manufacture cheaper instruments without spoiling the earlier fingering system (Ingham 1999: 34). An investigation of how the American and French manufacturers had different design and manufacturing techniques will now be addressed.

Undoubtedly, the popularity of jazz and Big Band music in this era contributed many design changes that made the instrument's sound much brighter. This was done by changing the mouthpiece and bore dimensions to assist projection of the sound. The older saxophones

compared to those of the Big Band era sound muted and dark in timbre (Baines 1957: 143). It must also be remembered that jazz and classical players used the same saxophones, but favoured different mouthpieces. Johnny Hodges and Sigurd Rascher favoured the Buescher range of saxophones, while Marcel Mule and Coleman Hawkins were advocates of the Selmer saxophones of the era (Felix 2011)

C.G. Conn was the first to introduce their signature “underslung” (upper octave key slung underneath the crook) model by the mid-1930s. This was accompanied by rolled tone holes in combination with L-shaped metal rings built into the pads which pulled the leather covering tight and flat. As long as the holes on these instruments remain undamaged the seals on the pads will remain unharmed for a long period of time. A saxophone manufacturer like C.G. Conn was now looking to improve the durability of their saxophones (Ingham 2005: 33). In Lefebvre’s time it was not uncommon for an instrument to last for more than 6 years (an astonishingly short amount of time for a modern instrument) and sources show that C.G. Conn took steps to ensure the durability and longevity of instruments (Noyes 2000a: 7).

In France, Selmer had done much to improve their saxophone models to compete with the American manufacturers. Selmer devised a system where the G# key could be played by means of a knuckled link requiring much less pressure, which influenced the design on the famous Selmer Cigar Cutter models. By 1935, the Selmer Super Balanced Action had less subtone than its predecessors and a brighter (but not thinner) upper end. Most importantly, this instrument had a roundness of the harmonic spectrum that few other instruments of the era could produce (Ingham 1999: 34). The innovation of the articulated or automatic G# is a standard feature today, but in the 1930s it was only used on expensive saxophones, like the Selmer Super Balanced Action models (Pinksterboer 2007:61). The Selmer saxophones of this era were the first to introduce a design that is now common on modern instruments. The idea was to move the lower keys of the instrument away from the body of the performer and the produce saxophones with all the keys on the right side. A patent application from 1937 illustrates the thought process involved in this mechanical alteration:

In saxophones of the prior art constructions, the mechanisms for operating the tampions, which control the vents in the bell of the instrument, are so positioned that they project beyond the side of the instrument opposite to the side of the bell in which the vents are provided. This projection of the tampion operating mechanisms is very undesirable because it is frequently necessary for the player, when playing the instrument, to hold the latter against his body, with the result that portions of the mechanisms are caught in the clothing of the player and with the further harmful result that certain portions of the mechanisms, such as the actuating rods or shafts, are bent. It is, therefore, an object of the present invention to position the mechanisms for actuating the bell-vent tampions so that said mechanisms do not. (Selmer 1937)

The Super Balanced Action Selmers of the 30s and 40s were the foundation for the modern key layout although American manufacturers were very slow to adapt to the system. The Selmer system has various benefits as the little finger now benefits from G# to low note articulation incorporating a C# and Bb link via a tipping Bb spatula. There were many mechanical similarities between Selmer and Conn instruments of this era, like the G and bis key that was included by both manufacturers in their designs (Ingham 1999: 32).

Buescher was also developing a saxophone that achieved iconic status with classical saxophonists from the 1930-1950 era. This saxophone was marketed to the public as the Buescher Aristocrat. This model was renowned for its free-blowing properties and a rich, full tone. The signature Buescher bore has been the chief factor that advanced the Buescher brand's trademarked sound on their instrument and the dimensions of this bore is still used on many instruments today. Extra durability was added by means of the screw-in, gold-plated Norton spring and with Buescher's signature "Snap-On" pads the instrument was widely believed to be of superior build quality (Ingham 1999:34). The "Snap-On" pad system, made other manufacturers like C.G. Conn devise improved key-pad systems on their instruments to keep up with the Buescher factory's innovations. This is clearly reflected in the patent applications from the C.G. Conn Company in the 1930s that described a system similar to the Buescher's "Snap-On" system (Gulick 1930). By the 1940s, Buescher had introduced a revolutionary new key pivot screw system that eliminated some wear on their instruments and facilitated an easier action (Comer 1941).

Proponents of the Rascher School, like John Edward Kelly, believe the proportions of the Buescher Aristocrat to be ideally suited to the classical style. The later instruments of the 1940s were no longer built on the principles of Adolphe Sax's acoustics, but on modifications that would increase the instrument's volume. It seems that Kelly regards the Buescher Aristocrat (he plays on a very early Aristocrat from 1928) as the perfect sound of the classical saxophone. Kelly comments in an interview with Segall:

The changes in the shape of the bore and the proportions of the mouthpiece have amounted to a bastardisation of the instrument, he says. (Some might say a bastardisation of bastardisation.) On the original-style saxophone, the fundamental relationships of the overtones remain the same. The fundamental colour does not change between pianissimo and fortissimo. But the harder you blow into a modern mouthpiece, the more you stress the higher harmonic partials of the overtone series, for the simple reason that the mouthpiece, the inside of which is smaller than the beginning of the bore, offers no inherent resistance⁴ (Segall 2005: 247).

Kelly also criticises the fundamental modifications on the saxophone mouthpiece of the 1930s and 1940s. In another part of his interview with Segall he describes these alterations:

The alterations made to the mouthpiece in the thirties and forties-its chamber was made roughly equal to the shape of the bore-corrupted the tone of the instrument, he says, making it incompatible with other instruments and discouraging conductors from including it in their orchestras (Segall 2005: 248).

The C.G. Conn factory made efforts to improve the key spatula on the high E key that is operated by the left-hand. On older saxophones this key was usually flat and not easy to operate. This spatula also necessitated an improvement of the springs and the positions of the posts on the saxophone to accommodate the installation of this extra key. The first humped key spatula was patented by the C.G. Conn Company in 1931 (Kerr 1931).

The spatula keys needed improvement as far as players were concerned and the C.G. Conn Company presented its own solutions. This solution can be summarised in the following extract from a patent application from 1936:

⁴ This view can be contested: If the width of the throat of the mouthpiece is narrower than the beginning of the bore it would offer less and not more resistance. Modern mouthpieces typically have modified baffles, larger chambers and tip openings than those designed by Rascher. This probably contributes more to the emphasis of higher harmonic partials and lessened level of resistance.

The specific improvements of the present invention are directed to the assembly of keys or finger pieces for controlling the G-sharp key and other keys. This assembly comprises a plurality of flat finger plates arranged closely to each other to permit the little finger of the player to slide from any of these plates to another one; the assembly of these plates and the pertaining bars and keys controlled thereby is, furthermore, characterized by the arrangement whereby depression of any of these plates of the assembly will also effect the opening of the normally closed G-sharp pad of the instrument (Loomis 1936).

4.5 Analysis of Ibert's *Concertino da Camera* (1935)

The *Concertino da Camera* (1935) by Ibert is quite often mentioned as the perfect composition by a composer for a solo instrument (Rousseau 1982: 108).

Jacques Ibert was an esteemed composer who studied at the Paris Conservatory from 1910-1914. After his studies he was awarded the Grand Prix de Rome in 1919. He did not only explore traditional styles, but also the popular styles of his day. He also composed many film scores in the 1930s which developed his particular style that was influenced by popular and dramatic music. The composition *Concertino da Camera* was influenced by Sigurd Rascher, who wanted Ibert to write a piece that would promote the capabilities of the saxophone; the *Concertino da Camera* was the result (Chamberlain 2012:17). Graves describes Ibert's style in the following paragraph:

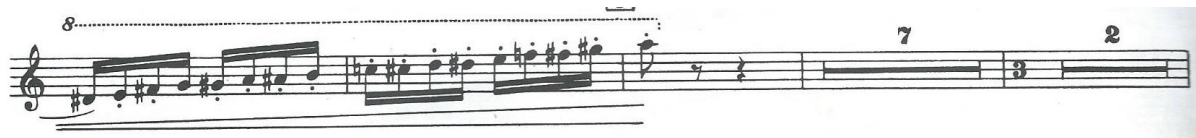
Ibert tended to use standard forms, such as sonata, rondo, concerto, and fugue, as a compositional basis, yet modified them, infusing modern sounds into these forms. Within the classical framework, his compositions display a variety of musical ideas inherited from the romanticists and impressionists. He also incorporated popular styles of the day such as jazz and dance hall music. Harmonically, Ibert writes within a traditional tonal framework, yet he continually obscures the tonality by incorporating chromaticism, fluctuations between major and minor modes, rapidly shifting tonal centers, and non-tonal elements such as octatonic scales and quartal harmony (Graves 1998: 47).

Ford analysed Ibert's work and has found distinct examples of jazz influences, including octatonic (diminished) scales and rhythmic syncopation. These features can be found throughout the *Concertino da Camera* (Ford 1991: 59). Graves (1998) argues that this work's jazz influence is evident in the rhythmic patterns and not in the harmony. After all, composers like Stravinsky had already utilised new harmonies and Ibert most likely borrowed these concepts. The work is an important example of the use of the altissimo register and Rascher

designed very detailed fingering charts for this piece that is probably the most famous work for the classical saxophone (Rascher 1983: 19).

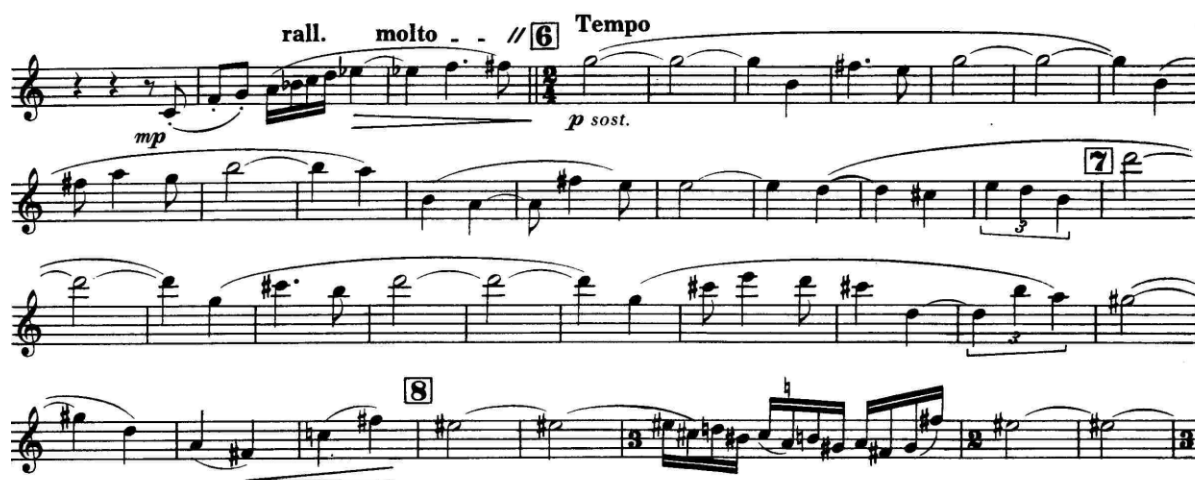
The *Concertino da Camera* is famous for the altissimo register that is required to play the piece to its fullest potential. The first instance where the altissimo can be utilised is in bar 51). The cadenza of the *Larghetto* section is also notable. Ibert offers an *ossia* part or he labels the extended range as optional for players with less facility in the altissimo register (although this is also challenging for the performer).

Bar 51-53 (altissimo G# and A) (Ibert 1935)



Although the *Concertino da Camera* (1935) is a virtuoso work that utilises the altissimo register in many instances, it is not devoid of lyricism. The melodic passages that are used here contain certain sensitivity to this capability that the instrument possesses. The passage is short-lived though and the virtuoso passages continue from the third bar of rehearsal number, 8.

Bar 63-91 (Ibert 1935)



The altissimo register is used to its extreme extent in the following passage. Here the last F of this phrase must be played an octave above the normal saxophone's range. The biggest demands in terms of altissimo are required in the 115th bar of the composition (this is the highest extent of the altissimo on saxophone in the piece) Clearly, it was not enough for Ibert to explore the capabilities of the lower altissimo, since this composition requires much more facility than just a mastery of the lower altissimo like high F#, G, A, Bb.

Bar 109-116 (Ibert 1935)



Ibert also utilises difficult, yet close and chromatic intervals and scalar motion that he believed a good player like Rascher was able to do. To play the following passage at a fast tempo many keys like the side key C, bis Bb and alternative F# are required.

Bar 122- 130 (Ibert 1935)



The cadenza of the *Larghetto* movement utilises the extreme registers of the saxophone (both high and low) and in contrast to both the *Rapsodie Mauresque pour orchestre et saxophone alto* by Debussy and the *Fantaisie sur un thème originale* by Demersseman the lower register is extended beyond the B. Again a high degree of skill is necessary to play both the written and *ossia* parts.

Larghetto Cadenza (Ibert 1935)

40 CADENZA

ad lib.

41 Tempo

p

4.6 The relation of repertory to technological development from 1930-1950

The revitalisation in classical saxophone that was sparked by great players all around the world generated interest in composing music that would elevate the genre and demonstrate the capabilities of the saxophone. This is evident when one regards the famous repertory pieces of composers like Ibert, Creston and Glazunov.

By this time, saxophone manufacturers were producing more standardised instruments. The sources have indicated that once patent applications were approved, other manufacturers copied or improved these designs further. During the 1930s it would seem that the standard side key C, F# and *bis* keys seems to have been manufactured by most of the great manufacturers like Selmer, C.G. Conn and Buescher.

Instruments were clearly now available that eliminated most of the early awkward systems of the Adolphe Sax instruments. This afforded players more flexibility and comfort in playing more difficult pieces as demonstrated by the *Concertino da Camera* (1935).

Chapter 5 Conclusion

This chapter will now conclude by providing summarising descriptions and informed opinions (substantiated by the research of the previous chapters) to answer the research questions.

It is clear that even during the first hundred years of the saxophone's existence the instrument's mechanics were substantially modified. Within 400 years the acoustic dimensions and basic proportions of the violin's design changed little, while the saxophone was modified in many regards (Moravcsik 2001:141).

Within the span of one century, the saxophone changed from a low bass voice (partaking qualities of both the woodwinds and brass) to a bright, solo instrument that possessed brilliance of sound in all registers.

The sources that were studied have shown that one of the most noteworthy technological modifications of the instrument was the removal of the double octave mechanism and the installation of a single octave key. I believe this to have been one of the biggest hurdles that needed to be overcome if the saxophone was to become an instrument that possessed ergonomic key layout to enable players to manage technical passages with more comfort. It is therefore no surprise that an early saxophone virtuoso like Souallé proceeded to remove the dual octave mechanism and most manufacturers were to follow this trend. Therefore, the dual-octave mechanism was old-fashioned by the 1900s.

Furthermore, the inclusion of finger rollers on the Eb and C keys, as well as alternative keys like the C, F# and *bis* keys were considerable improvements in the saxophone's design that further helped the instrument to become more comfortable to play and to learn. Later, the improvement in the spatula keys, like the knuckled G# key and rollers for the Bb, B and C#, were also important additions to the saxophone. This led to the Selmer Super Balanced Action models of the 1930s that paved the way for the modern saxophone's design and construction with regards to the spatula keys.

Apart from ergonomic improvement, there were also many alterations to the bore sizes, tone holes, mouthpieces and bell flares of the instrument in order to affect tone. The goal seemed to

be to make the instrument louder and brighter. I agree with Dr. Paul Cohen, Ralph Morgan and John Edward Kelly that the increasing bore diameter and mouthpiece design were more decisive in changing the saxophone's tone than other small attempts to change the parabolic nature of the original saxophones into a completely conically shaped instrument. This debate is still relevant for many students of the acoustics of the saxophone. The argument does not seem to be resolved as many people assert that the Adolphe Sax instruments and early Bueschers possessed their unique tone due to their parabolic shape; others (like me) believe the darker sound to be mainly the result of reduced bore diameters and suitable mouthpieces as compared to modern saxophones. Again, how "dark" a sound might be perceived is not something that is quantitative and, as a result, most of these opinions will be largely subjective.

The trend in the first century of the saxophone's existence was also to extend the range. The first saxophones were limited to a range of B to high Eb, but by the 1950s it is clear from the Aristocrat and Super Balanced Action models that the range was extended to the low Bb and upward to the high F. That range was considered to be standard from the 1930s onward as the C.G. Conn, Buffet-Crampon and Martin saxophones also possessed such keys.

The mechanical advancements have certainly benefited classical saxophonists in many ways. First of all, the improved ergonomic system effectively eliminated some of the difficulties in the transition of registers; the dual octave mechanism was cumbersome. Saxophone players (especially if they were clarinet doubler, which was a historical likelihood) must have had extraordinary difficulties in managing a piece like the *Fantaisie sur un thème originale* by Demersseman, as the awkward and somewhat primitive mechanisms of the instrument would have made certain passages difficult.

The early saxophones were obviously suited to playing works that were considered quite exotic and arabesque for the time. In Debussy's *Rapsodie Mauresque pour orchestre et saxophone alto* the saxophone is used to convey a sombre, yet mysterious and colourful tone that is reminiscent of the literary works of Edgar Allan Poe (from the sources, this seems to be a major influence on the works of Debussy). The composition does not really extend the limits of the saxophone as other virtuoso works (apart from a few altissimo passages), but the composition

is notable as it utilises the tone of the early saxophone to admirable effect and is perfectly suited to the impressionistic writing concepts and the harmonic and melodic style of Debussy.

By the 1930s a composer like Ibert could employ the saxophone as a virtuoso instrument as players like Sigurd Rascher and Marcel Mule had pushed the envelope in terms of range and technique. This inevitably resulted in a piece like *Concertino da Camera*. Even on a modern saxophone (equipped with more keys for the high register and ergonomics to facilitate the accurate playing of difficult lines) the composition is difficult and intricate. Without the mechanical additions that Buescher and Selmer installed in the 1930s the piece would have been more difficult to play.

Idiomatic writing for the saxophone changed radically in the first century of its existence. In the saxophone's infant stages it was an instrument that was well suited to play lyrical and melodic material (and in some aspects this perception influenced Debussy's later work for the instrument). This inherent lyricism that the instrument possessed was used to a limited extent by composers like Demersseman, and later by Ibert, but the chief aim of these composers was to explore the virtuosic capabilities of the instrument. This included playing complicated technical melodic lines, exploration of the saxophone's higher register and extended dynamics. Most composers, like Ibert were influenced by teachers and musicians like Rascher and Mule to write virtuosic works, thereby promoting the saxophone to a slightly more elevated status in the classical world.

I had not anticipated that socio-cultural perceptions and changes in musical style actually had such an enormous influence on the repertory and technical development. The following paragraphs explain this postulation.

The influence of popular music and jazz was both positive and negative for the classical saxophone. On the positive side, the "Saxophone Craze" inspired manufacturers to create better instruments and to manufacture more for a general public who became increasingly enthusiastic about the saxophone. Consequently Americans like Buescher called it the "national instrument" of America. For the public a simpler, more effective and cheaper instrument needed to be manufactured for them to learn and enjoy.

Unfortunately, the sheer magnitude of amateurs, the spectacles of saxophone performance in vaudeville and early jazz and its image as a risk to the moral *status quo* influenced the classical saxophone in a very negative way. Fewer and fewer composers thought that the instrument was capable of a higher calling in the concert hall and the repertory was marginalised to the extent of oblivion. The fact that there were not many capable instrumentalists or an established pedagogical system also contributed to this concept. The instrument was almost eradicated in Germany and Russia and this severely compromised the development of the instrument in countries that possessed a rich cultural and musical heritage. The early twentieth century did not deliver many works of note, but a renaissance, led by Rascher and Mule certainly sparked more interest in the instrument's capabilities by the 1930s.

The development of the saxophone cannot be solely attributed to the skill of the manufacturers, the composer's or the performer's skills, but it was rather a cross-fertilisation of these three factors that stimulated both development and repertory of the instrument. For instance, Buescher produced saxophones that largely enabled Sigurd Rascher to play fluid melodic lines and explore the fullest extent of the saxophone's range at the time (similarly, Selmer was enabling the same capabilities for Marcel Mule). Rascher, in cooperation with Ibert could produce a work that showcased the saxophone's capabilities in the *Concertino da Camera*. Therefore, the players themselves (like Rascher) had a major impact on the repertory and the design of the saxophone.

To a large extent, the original saxophone has been modified within its first century and notably the tone of the original instrument changed the most. The increased bore diameter, tone holes and key heights with the addition of new key layouts were the factors that led to the instrument playing much louder and higher. By the time that the *Concertino da Camera* was written, the instrument, especially the alto saxophone, possessed a brightness and brilliance that did not match the descriptions of Kastner, Berlioz or Fétis.

It is no secret that many people (musicians and composers included) nowadays detest the saxophone and its tone and always remark on its extreme shrillness, bad intonation and propensity for high amplitudes. This can be attributed to the somewhat misguided

developments from the 1930s onward by the changes of the mouthpiece and bore diameters, these being chief factors that gave the instrument these qualities. Again, these less desired qualities are also enhanced by players who are not proficient on the instrument. One must bemoan the loss of the saxophone's original sonority to a certain extent, since it has lost its darker qualities and tendency to blend with other instruments. Adolphe Sax's saxophone could do so with much more effect than the saxophones of today. On the other hand, the innovations of the 1930s and 1940s have given the saxophone the ability to play higher and lower at incredible volumes and with extreme power and authority. This has led to the instrument being designated as an instrument that is well suited for the soloist.

Lastly, I suggest that technological developments have both added and subtracted much to the classical repertory. This statement might seem like an illogical paradox, but it must firstly be considered that the improved saxophone ergonomics, manufacturing techniques, durability and high register capabilities definitely added to the virtuosic nature of later compositions and performers. The technological development did unfortunately completely change the original sonority of the instrument leading to a loss of its dark and suave tone that few modern-day performers can replicate.

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