On the History and Future of Clarinet Systems

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Master's Degree Thesis
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Submission date: 20.1.2018

Abstract

This project describes the most popular clarinet systems, their history, and their potential for future development. The historical survey at the beginning of the paper provides the necessary context for the systems used today. This information may help clarinet players to gain a better understanding of the modern instruments and their potential for further improvement. The collaboration between musicians, instrument makers, and composers was and still is of utmost importance for the development of instruments. The significance of such collaborations is confirmed by instrument maker Jochen Seggelke.

It may seem that the current gap between the German and French clarinet systems can never be bridged. A closer look reveals that in addition to matters of taste and tradition, politics, wars and industry changes contributed to the widening of this gap from the mid-19th to the mid-20th century. In the last few decades, however, the Western world enjoyed relative political stability along with advances in technology, which facilitated a lively exchange of information and opinions.

Moreover, the overwhelming variety of music available to musicians and audiences nowadays results in a more international musical taste. Instrument development is subject to taste, and so the current development of both systems promotes flexibility. Players can produce remarkably individual sounds but also very similar timbres on both systems if they share similar sound esthetics. In the past three hundred years, players, makers, and composers attempted to combine all available ideas and advantages concerning the physics and mechanics of the instruments. This collaboration, which was so common in the clarinet's history, continues today.

Keywords: Clarinet – German system – French system – Instrument development

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Introduction

The development of an instrument is not linear; it consists of many stations, experiments, ideas, problems and solutions. The clarinet is an interesting case where several types, so-called systems, do not give rise to one technically improved instrument but continue to coexist. The main types are the German system, the French Boehm system and the lesser-known Reform Boehm system. See Fig. 1 below. In this paper I will show that the clarinet has not yet reached a standard form. I will also share my thoughts about the current and future developments of the instrument and the possibilities of merging the various systems.

The paper is addressed to clarinet players of all levels from hobby to professional players. It provides background information on the history of the instrument in central Europe, and discusses aspects of organology that promise to be of interest to clarinetists. It discusses the differences between the various systems and whether these differences are audible. It also addresses questions such as the following: where do the different systems come from, and why do they all still exist? Where in the world is it possible to find an orchestral or a teaching job? Is changing a system possible, and when is it advisable?

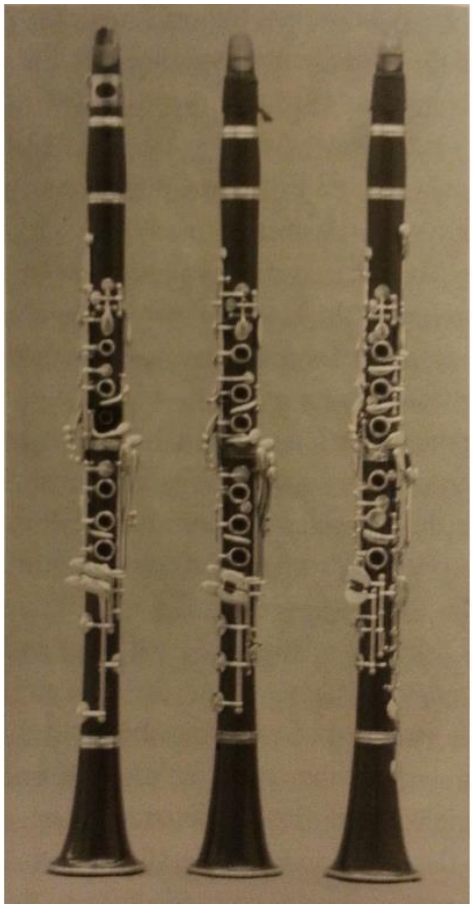
In the following chapters, I will provide a survey of the historical development of these three main systems, focusing on the developments in central Europe. The historical overview is intended to give answers to some of the questions raised above. It provides perspectives regarding the current situation and potential developments, especially considering the gap between the German and French clarinet traditions. Also, to gain more specific knowledge on current developments I conducted an interview with Jochen Seggelke, an instrument maker who is one of the few world-renowned experts on making the major three clarinet systems.[1]

Over the course of the past three hundred years, the clarinet has constantly been evolving. Although the changes are subtler today, this process is still ongoing. When I began

[1] See the appendix for a transcription of the interview. The interview was conducted in January 2015.

this project, I assumed that system hybrids were something special in the history of instrument development. However, I realized that looking though the historical context I found that we are instead continuing a tradition that was firmly established over the course of the past three hundred years.

Fig. 1: Hoeprich, *The Clarinet*, p. 6, The Clarinet Systems—French Boehm, Reform Boehm, and German Oehler



Chapter 1: The Origins of the Clarinet

This chapter provides a short overview on the development of the clarinet from its origins in the 17th century to the crossroad in the mid-19th century, when the Boehm-system clarinet was invented and introduced in Paris.

Single-reed instruments have existed in ancient cultures, the earliest of which are documented in ancient Egypt several thousands of years ago. Several others are documented in the Middle East, Greece and the Roman Empire. Among these early instruments two types can be distinguished: (1) idioglot instruments whose reed is a part of the tube and (2) heteroglot instruments that have a separate reed, like the modern clarinet. Due to their fragility none of the instruments from antiquity survived, but graphical evidence of idioglot instruments has been traced to approx. 2700 BC. Traditional ancient instruments that are still played today—like the arghül and zumma in Egypt and the aulos in Greece—differ only little from their ancient ancestors. The first European idioglot instruments resemble those of the ancient cultures. One of these instruments is the chalumeau. The name "chalumeau" is derived from the Greek word *Kalamos* or Latin word *Calamus* meaning "reed pipe." The chalumeau is in many ways the most direct relative of the clarinet.[2] Chalumeaux (pl.) of the 17th century where made by well-known instrument makers and appeared in works of distinguished composers. Chalumeaux possessed two keys which covered tone holes drilled diametrically opposed. The position of these holes makes overblowing practically impossible thus leaving the instrument with a range of only slightly more than an octave.

The birth of the clarinet is traditionally associated with one of the greatest instrument makers of that time in Europe, Johann-Christoph Denner (1655-1707). Though some current research suggests that the inventor was his son, Jacob Denner (1681-1735).[3] Like the Chalumeau, the earliest clarinets possessed two keys, but the holes covered by the keys where

[2] Cary Karp, "The Early History of Clarinet and Chalumeau," *Early Music* 14, no. 4 (November, 1986), 545-51.
[3] Ibid.

not diametrically opposed. They had a cylindrical bore and featured a flared bell with a conical bore. Like today's clarinet, they could overblow a twelfth, providing a range of over three octaves. These early two-keyed instruments, which were in use between the mid-17th and the mid-18th century are referred to as "Baroque clarinets." See Fig. 2 below. The earliest printed work for clarinet is a set of anonymous duets published by "Roger" in Amsterdam. The first print, made between 1712 and 1715, has disappeared, but a second edition is preserved in Brussels.[4] The range of those duets is c' to a''.[5]

The key of D major is slightly puzzling. According to the notation convention of transposing instruments in central Europe in the 18th century, the notated pitch is not the sounding pitch, meaning the player should play the printed notes like it is nowadays. In England, by contrast, composers such as Handel would notate the sounding pitch (for a trumpet for example), assuming the player would find the most fitting way to play the sounding pitch.[6] D major was not an idiomatic key for Baroque clarinets. It is therefore likely that these early compositions follow the English convention, and that players performed them in C major on a D clarinet, which was the most common size. Another common clarinet size of the early 18th century is the slightly longer and lower C pitch. A rare piccolo clarinet in high F from the early 1700s is displayed at the instrument collection of the Meiningen city museum, Germany.

At that time, the clarinet's register in use matched the high register of the trumpet. Indeed, the name clarinet along with other early names such as clarone, clareni and clarineto is similar to the "clarino", a Baroque high-pitch trumpet.[7] In *Musicalisches theatrum*, a study of performance practice, the organist Johann-Christoph Weigel (1661-1726) describes the proper way of composing for clarinet, and placing it in an ensemble: "When the trumpet call

[4] Eric Hoeprich, *The Clarinet*, (New Haven: Yale University Press, 2008), 31-37, as well as: Robert A. Titus, "The Early Clarinet Concertos," *Journal of Research in Music Education 13*, No. 3 (Autumn, 1965), 169-76.
[5] According to the Helmholy pitch notation with middle c being c'.
[6] Hoeprich, *The Clarinet*, 31.
[7] Kurt Birsak, *Die Klarinette, Eine Kulturgeschichte* (Buchloe: Obermayer GmbH, 2005), 24-25.

is all too loud, the clarinet knows how to please."[8] In 1721, Georg Philipp Telemann included clarinets in D and C in three cantatas. At another occasion in 1728, he paired a D clarinet with a D trumpet treating them equally. In fact, they even share the same staff in several parts of the score, which suggests that the clarinetist was substituting for an unavailable trumpet player. Some Concerti Grossi by Antonio Vivaldi with clarinet solo parts, such as RV 559 and RV 560, appeared after 1720. These works reflect a more imaginative use of the new instrument. Vivaldi successfully demonstrates the contrast between the low chalumeau register and the bright high register. George Frideric Handel included clarinets at a few occasions from 1740 onwards, as did J.P. Rameau in Paris. Did J.S. Bach know of the clarinet? Theoretically, there is no reason why Bach should not have been aware of the instrument. Since the terminology regarding the clarinet had not yet been established at this point, there are speculations as to whether the term "lituo", otherwise referring to zink or cornetto, might have referred to the clarinet in BWV 118.[9] The first solo concerti for the clarinet, written by Johann Valentin Rathgeber (1682-1750), were published in Augsburg in 1738. Johann Melchior Molter's (1696-1765) six concertos for clarinet in D, written in the 1740's, were more significant. These works include extensive passages in the instrument's highest register.

Both Chalumeau and the early Clarinet continued developing along different lines during the 18th century. By the end of the century, though, the chalumeau disappeared, and the clarinet established its place in the music world. By 1800, clarinets were featured regularly in orchestras and ensembles as well as solo instruments. Composers like Johann and Carl Stamitz were among the first to recognize its potential. Carl Stamitz wrote eleven clarinet concertos. Haydn, Mozart and Beethoven served to secure its place as an orchestra, chamber and solo instrument once and for all.

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[8] Johann-Christoph Weigel, *Musicalisches theatrum* (1722), 14.
[9] Eric Hoeprich, *The Clarinet* (New Haven: Yale University Press, 2008), 34.

Fig. 2: Hoeprich, *The Clarinet*, p. 24, Three-Key Clarinets and Tenor Chalumeaux Made by Johann Christoph Denner

Chapter 1.1: The Classical Clarinet

A grey area of the instrument development lies between 1740 and 1760. Works by Molter, Stamitz and Rameau show a growing interest in the instrument and imply a greater skill on the players' part. It is uncertain when and how the two- and three-key instruments tuned in D and C changed to five-key instruments tuned in C, B-flat and A. The position of the fourth key differs according to geography, being either a key for the right hand (Ab/Eb) in Germany or for the left hand (F#/C#) in France. Although no particular maker can be given credit for the addition of a fifth key, this was clearly a German invention.[10] Typically, the instruments of the 18th century were made on boxwood, fitted with horn or ivory at the joints and occasionally at the rim of the bell. Keys where made of brass or silver with a square shape. Round key covers did not appear until after 1800. Whereas the early clarinet makers

[10] Ibid, 70.

attached the springs to the instrument body, later makers began to attach them to the keys themselves, thus giving a variety of possibilities of mounting them on the instrument. Another difference with respect to the Baroque clarinets was the division in more separate parts to prevent the wood from cracking. The instruments where equipped with various barrels for the common tunings A = 420-440 Hz. Variations of pitch reflected regional preferences. A higher pitch was common in military bands. The five-key instruments are generally referred to as "classical clarinets" and were in use in the second half of the 18th century and well into the 19th century. Franz Joseph Fröhlich (1780-1862) describes how the need of using different clarinets for different tonalities is in fact a source for variety of sounds and colours:

> The clarinet is not able to play in all keys, as is the oboe or the flute, without the addition of other pieces, thereby producing a clarinet of a different size and pitch. The most common clarinets are in C, B-flat and A. Although this may seem to be an imperfection, it is actually an advantage. The B-flat clarinet, due to its greater length, and especially the A clarinet, has a unique quality of softness with a sound like a basset horn or the bassoon.[11]

The important composers of that time, such as Haydn, Mozart and Beethoven, recognized this and composed for the instruments and their unique colours. Here are some of the less known, yet major contributors to clarinet solo and chamber-music repertoire of this time: Johann Stamitz (1717-1757), Carl Stamitz (1745-1801), Franz Anton Hoffmeister (1754-1812), Franz Danzi (1763-1826), Jean Xavier Lefévre (1763-1829), Ignaz Pleyel (1757-1831), and Francois Devienne (1759-1803).

[11] Ibid, 68.

Chapter 1.2: Mozart and the Clarinet

"Ah, if only we too had clarinets! You cannot imagine the glorious effect of a symphony with flutes, oboes and clarinets."[12]

This quote might be one of the most used and beloved concerning the clarinet. It captures Mozart's special receptiveness to this new instrument in a letter which he wrote to his father in Mannheim in 1777. Mozart first heard clarinets in Salzburg in 1770. These two- or three-key instruments were played by bandsmen in his hometown, but as early as 1764 the young Mozart had already copied and arranged a score of a symphony by Carl Friedrich Abel (1723-1787), which featured clarinet parts. For a certain time, this symphony was mistakenly considered to be Mozart's Third Symphony. Abel's use of clarinets influenced Mozart as did that of Johann Christian Bach ("the English Bach") who included clarinets in many of his works and whose music Mozart is known to have admired.[13] Mozart employed clarinets for the first time in his Divertimento, K. 113 in 1771. Although the parts in the Divertimento and subsequent works are modest, they show knowledge about the instrument. Six years later in Vienna, Mozart replaced the oboes with a pair of clarinets, giving them a much more significant part in Symphony, no. 39 by using the entire range of the instrument skilfully and humorously. Mozart continued giving the clarinets more prominent parts in his chamber music and symphonic works.

A great influence was, without doubt, a close friendship with the clarinetist Anton Stadler. Brothers Johann and Anton Stadler were clarinet players at the Vienna court orchestra prior to Mozart's arrival in 1781. In the early 1780s, the Vienna court ordered clarinets for the Stadlers from Theodor Lotz, an instrument maker from Pressburg (Bratislava). The connection between Stadler, Lotz and Mozart had a great impact on the instrument and music to come. Lotz made improvements on the instruments, giving Stadler more possibilities for

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[12] Ludwig Schiedermair, *Die Briefe W.A. Mozarts und seiner Familie - Band 1*, (Munich: Georg Müller, 1914), 138.
[13] Eric Hoeprich. *The Clarinet* (New Haven: Yale University Press, 2008), 100.

expression and precision in performance. This, in turn, inspired more compositions by Mozart to feature the new possibilities. Theodor Lotz made all future instruments of Stadler, including a special basset clarinet in A, for which Mozart wrote some of the most important and prominent works in the clarinet literature such as the Concerto K. 622 and the Quintet K. 581. A basset clarinet is a clarinet in A with a low extension of a major third. This instrument was about to become obsolete but is experiencing a revival since the 20th century due to the trend of historical performance practice and the desire of different players to play the pieces as Mozart intended. The collaboration between A. Stadler and T. Lotz produced improvements on the clarinet and basset horn, such as an addition of a separate knee joint to the basset horn and a low D key as well as mounting keys on brass saddles. The additional D key was utilized by Mozart in the second basset horn part of his Serenade K. 361 completed in 1784. In an interview held in January 2015, instrument maker Jochen Seggelke spoke about the connection between composer, player and instrument maker being an inseparable part of the instrument's history. Any of the three parties may have an idea that may change the instrument, the performance or the composition. If a composition presents greater technical challenges, instrumentalists typically will try to find the best solution and sometimes also turn to their instrument makers for further help. Conversely, innovative players and makers encourage composers to exhaust the many ways the instrument can be used. The personal relation between them is crucial:

> This is something you see over the course of three hundred years of clarinet music: Mozart, Stadler and Theodor Lutz. They created a special piece with a special instrument and special performance (Clarinet Concerto, K. 622). More examples are: Brahms, Mühlfeld, and Georg Ottensteiner; Streitwolf, Spohr, and Johann-Simon Hermstett; Crusell (as a player and composer), and Heinrich Grenser. You will find this in any place in the world, and I'm sure the moment a player has a personal relation with his instrument maker, he will ask him for different things. As a result, the instrument maker will not sleep until he finds the solutions.[14]

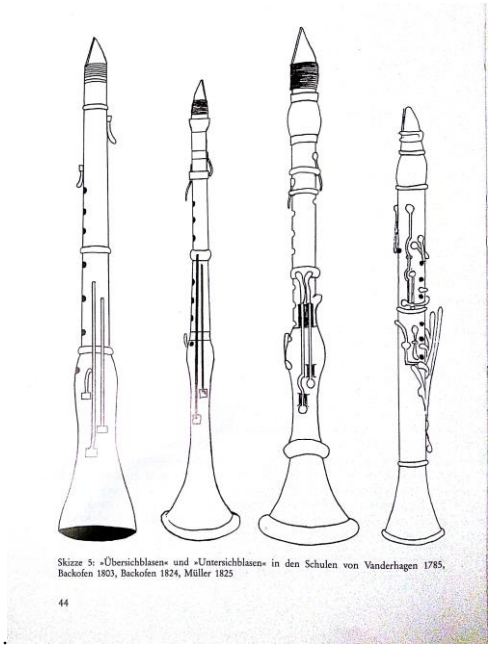
At this point I must add information on the reed position. Many clarinet manuals from before 1800 include illustrations of playing with the reed against the upper lip, opposite of

[14] See the appendix for a transcription of the interview. The interview was conducted in January 2015.

today's reed position. In England, France and Italy, playing with the reed against the upper lip was unquestionably common practice. Many French and English five-key clarinet makers have marker stamps on all the joints including the mouthpiece, indicating that the reed touches the upper lip. In Germany, Austria and Bohemia, by contrast, evidence suggests that some players had already adopted the reed-below position, as shown in Fig. 3 below. German clarinetist and composer Johann Georg Heinrich Backofen (1768-1830) comments on the dispute concerning the reed position, concluding that both techniques can be used effectively: "Whether it is better to rest the reed against the lower or upper lip while playing […] is not for me to decide. I have heard good players using both methods."[15]

The friendship between Mozart, Stadler and Lotz is one example of a collaboration that encouraged the development of instrument, performance and composition. Such collaborations continued existing throughout the history of the instrument and are still of great significance today.

Fig. 3: Birsak, *Die Klarinette – Eine Kulturgeschichte*, p. 44, Illustrations of Diverse Reed Positions in Clarinet Manuals, 1785-1825



[15] Kurt Birsak. *Die Klarinette – Eine Kulturgeschichte*. (Buchloe: Obermayer GmbH, 2005), 41-45.

Chapter 1.3: The Clarinet in the Nineteenth Century

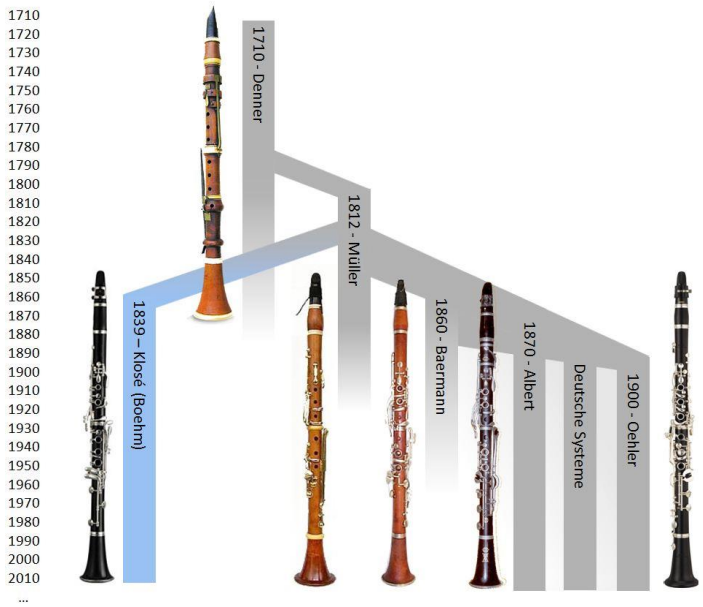
An enormous and rapid development took place in the first decades of the 19th century concerning instrument design, playing techniques and repertoire. An international cast of soloists appeared to promote the clarinet and to inspire solo works requiring great virtuosity. At the same time and with a direct connection, as explained in the previous subchapter, instrument makers were setting a fast pace of innovation, experimenting with and improving the instruments rapidly. The well-known instrument maker Heinrich Grenser from Dresden, whose earliest clarinets have five keys, made models with up to eleven keys after 1800. His instruments were played by some of the finest players in Europe such as Franz Tausch (1762-1817) and Bernhard Henrik Crusell (1775-1838). In 1812, Louis Spohr included a description of an eleven-key clarinet needed to perform his first Concerto, op. 26. The wood and other materials also changed in the search for a bigger volume of sound. In 1808, Heinrich Grenser and Iwan Müller (1786-1854) designed an experimental sixteen-key basset horn. Once Iwan Müller arrived in Paris, his experiments led to a thirteen-key clarinet which he presented in 1812. With this instrument, Müller predicted that it would be easily possible to play in all keys. Therefore, he assumed that the use of the A and C clarinets would diminish significantly and eventually disappear.[16] Müller did not only change the key work. He made instruments consisting of five pieces, cancelling the customary division of the right-hand joint. He also increased the length of the conical flare of the bore and enlarged the tone holes.[17]

In German-speaking countries, the Müller system was known as “invention clarinette”, and soon German clarinets were catching up with the new abilities of the Müller system. Although the Müller system is traditionally considered to be the basis for today’s German clarinets, the bore features mentioned above are typical of today’s French instruments. German makers indeed adopted Müller’s key system while keeping the more cylindrical

[16] Albert R. Rice, “Müller's "Gamme De La Clarinette" (c. 1812) and the Development of the Thirteen-Key Clarinet,” *The Galpin Society Journal* 56, (June, 2003), 181-84.
[17] Eric Hoeprich, *The Clarinet*, (New Haven: Yale University Press, 2008), 132-38.

shape of the bore. The French instrument makers, by contrast, adopted the bore shape and size of tone holes from the Müller system and, as a result, its sound characteristics. The split leading from the Müller system can be seen in the simplified diagram shown in Fig. 4 below. The shape of the bore is the most significant difference between the modern German- and French-system clarinets.

Fig. 4: Frost, *The-Clarinets.Net.:* History, Clarinet Evolution Simplified



Chapter 1.4: Birth of the Boehm System and Development of the German Oehler System

In 1844, a new clarinet system was presented in Paris as the "clarinet à anneaux mobiles" (clarinet with movable rings). The new system was developed in Paris by Hyacinth Klóse and Louis-August Buffet jeune. It provided a key system based on the logic and principles of the German flute maker Theobald Boehm. The shape of the bore, much like that of the Müller system, had a greater conicity at its lower end. The Boehm-influenced key system had seventeen keys and six rings. French players recognized the instrument's advantages and adapted to its differences. The new instrument was less popular in Germany than in France and other countries. Although this might seem like the crossroad that leads to

today's strict division between the German and French systems, a glance at clarinet makers' pricelists shows that by the end of the 19th century practically every workshop in Germany produced Boehm-system instruments alongside other instruments.[18] Yet, the desire to maintain a tradition of sound and playing style led German players to improve their instruments, in light of new demands from players and composers as well. Unlike the French instrument makers, German makers retained the bore and fingering system and simply added more keys. Alternative fingerings were provided for playing in more remote keys.

Major developments of the German clarinet were set in motion in the 1840's by the clarinetist and pedagogue Carl Baermann (1810-55). He worked together with Benedikt Pentenrieder (1809-49) and later with instrument maker Georg Ottensteiner (1815-79). Ottensteiner's instruments became famous as they were played by Brahms's favoured clarinetist Richard Mühlfeld. Lists from Ottensteiner's workshop provide an interesting link between the development in Paris and Munich. In 1860, the Baermann-system clarinet was listed last and the Boehm-system clarinet among the top of his offerings. A Boehm-system instrument is also unmistakably presented by the illustration on his price list, not the German-style instrument for which he is remembered. See Fig. 5 below. Ottensteiner advocated the Boehm system clarinet which was one of his most expensive instruments.

Finally, in the last decades of the 19th century, Oskar Oehler (1858-1936) made several further improvements and additions to the Ottensteiner-Baermann-system clarinet. As a skilled, experienced player, Oehler had a good sense of the details needed to make the instrument comfortable for the player. The Oehler improvements included additional fingering options and correction holes for better intonation and sound. Oehler rejected the practice of keeping the tone-hole number to a minimum, providing alternative fingerings with their own holes. The total number of keys on the new Oehler instruments was twenty-one. Most of the German instruments make use of the Oehler key work or parts thereof.

[18] Ibid, 175-79.

This “golden age” of innovation is reflected in the music literature. If considering solo repertoire, works by B. H. Crusell, L. Spohr and C. M. von Weber are great examples of the new capabilities of the clarinet. The most prominent Romantic composers such as Johannes Brahms, Robert Schumann, Franz Schubert, Felix Mendelssohn, Richard Strauß, Richard Wagner and many more followed the lead of Crusell, Spohr and Weber.[19]

Fig. 5: Hoeprich, *The Clarinet,* p. 178, Price List from the Workshop of Georg Ottensteiner, 1860

[19] Ibid, 123-205.

Chapter 1.5: The Clarinet in the Twentieth Century

Tradition and musical taste were not the only factors that influenced the growing gap between the French and German systems. Growing industrial abilities of mass production and two world wars, particularly the second, divided Europe into two blocks of clarinet systems. From the late 19th century up to the 1930s, dozens of workshops thrived in Germany. By the end of World War II, many workshops were closed for good. At the same time, industrialised manufacturing became more common, especially in France. Mass production techniques resulted in lower manufacturing costs and prices. The remaining German and Austrian workshops after World War II could no longer compete with the low prices of the French clarinets and therefore started focusing their efforts almost exclusively on German-system models. Bärmann-Ottensteiner instruments were still regularly built by Joseph Pöschl and several others throughout the 1940s. The Oehler-system was in greatest demand.[20]

Despite the political ups and downs in central Europe, innovation never stopped. In 1935, finally, Ernst Schmidt (1870-1954), Louis Kolbe (1863–1952) and Friedrich Rösch (1862–1925) invented the Reform Böhm system. This system applies a French key system to a German-bore instrument, intended to maintain the original sound combined with the ease of use and comfort of a French-key system. Fritz Wurlizer was the first established instrument maker who built these instruments with the instructions of the inventors, later adding his own modifications. Advocates of the Reform Böhm system, such as the Italian clarinetist Luigi Magistrelli, describe it as a perfect hybrid: "I would consider this instrument to be an ideal compromise between the dark, compact and warm sound of the German Oehler system and the more flexible, brighter and technically easier-to-handle French Böhm system."[21] This instrument became popular especially in the Netherlands, though it was never widely used in the rest of the world. The lack of recognition might be a matter of "bad timing" as it was

[20] Ibid, 209.
[21] Luigi Magistrelli, "The reform Böhm System", Sightlines, June 2009, http://www.luigimagistrelli.it/45352_June09_BohmSystem.pdf (accessed 2 September 2017).

conceived on the eve of World War II which prohibited its wide distribution. Opponents of the Reform Böhm system argue that the attempt to combine the systems is just a compromise at this point, as it creates intonation problems and a less defined sound profile. Like German clarinets, it is manufactured mainly in smaller workshops and not mass-produced. It was never adopted by the big companies such as Buffet-Crampon or Selmer. Nevertheless, the mere interest in Reform Böhm instruments indicates, in my opinion, an interest in making profit on all inventions.

Chapter 2: The Present and Future of Clarinet Systems

In this chapter, I share my observations as a clarinetist as well as those of instrument maker Jochen Seggelke about current and possible future developments of the various clarinet systems.

On the surface, it may seem that the gap between the German and French clarinet traditions could never be bridged. A French system player need not apply for an orchestral position in Germany or Austria, and the opposite is also true. Yet for the past few decades, the physical and political borders in Europe, particularly between Germany and France, allow for a much more direct and rapid cultural exchange than ever. Jochen Seggelke describes the current possibility for information exchange:

> We have many more possibilities to exchange, which is very important. We had a very strict border between Germany and France for decades: the river Rhein separated the clarinet playing in two halves of the world! Nowadays, it is almost like a non-existing border. The French really observe what we have done the last few years, and we observe as well [what the French do], not as carefully maybe, but nevertheless.[22]

Subtle changes are occurring all the time. Some examples of changes can be seen in German music schools, which often offer lessons on French-system clarinets since they are easier for the beginner and far more affordable. It is common to encourage advanced students to switch to the German system if they start thinking of a professional career and before they learn the main part of the instrument's repertoire (approx. ages 12-16). The decision as to which system to use lies with the teacher. Furthermore, there are already a few German orchestras in which players of both systems play side by side. In other parts of Europe and in the United States, where the French system is much more common, some orchestras acquire German- or Reform-system instruments to give their players the possibility of a more authentic feeling and sound when playing German literature. Changes on the instruments themselves are subtler than before. Modern German instruments differ from the traditional Oehler system in the diameters of their bore, tone holes, and by their key mechanics. For example, some makers,

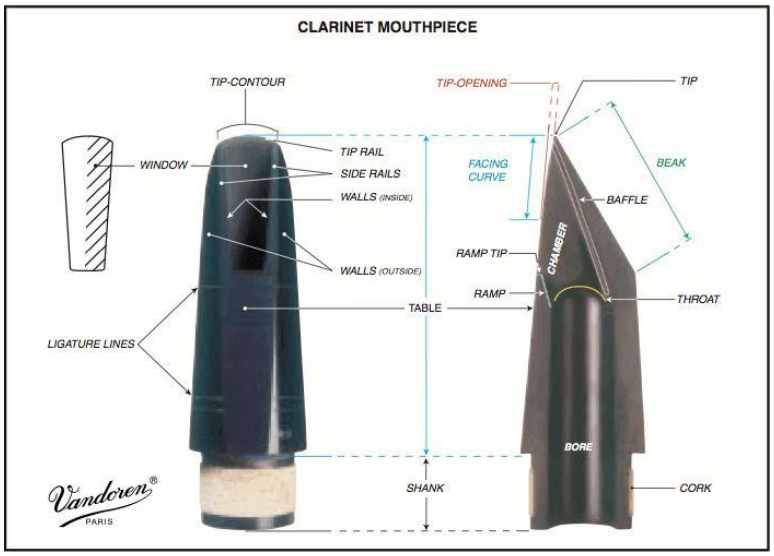
[22] See the appendix for a transcription of the interview. The interview was conducted in January 2015.

like Schwenk & Seggelke or Otmar Hammerschmidt, make very minimal use, if any at all, of the Oehler mechanics. The French instruments feature developments as well. One such example is the addition of the German correction key for the low E/F/F#, which is now a standard feature of French instruments made by big companies such as Buffet-Crampon.

A more significant change concerns the use of mouthpieces and reeds. The mouthpiece is considered by many players to be the most important part of the instrument because it determines to a large extent the sound profile and tactile experience. Pamela Weston writes in *The Clarinetist's Companion* that the choice of a mouthpiece is as crucial as the choice of an instrument: "The mouthpiece can make or mar an instrument, and as much trouble must be taken in the selection of this as of the instrument itself."[23] The design of the mouthpieces and reeds varies slightly between the systems. Mouthpieces can have a narrower or wider bore, like the instruments. The facing can be shorter or longer, and the opening of the tip is variable. The parts of the mouthpiece can be seen in Fig. 6 below. Traditionally, German-system mouthpieces are longer and narrower than the French ones. However, because a variety of models and makers are available in the whole world, players often do find compatible mouthpieces which were not designed for their system. When a specific wish arises to use a mouthpiece which does not fit, players turn to the instrument makers for help. Nowadays, special barrels are made to ease the mixed use, linking mouthpiece to instrument body more optimally. Even modifications to the instrument's intonation are made to fit it better to a certain mouthpiece. Players choose a mouthpiece according to their own physiognomy, taste and playing style. It is therefore noteworthy that German players choose to play with a French mouthpiece and vice-versa, suggesting a more global preference regarding sound profile.

[23] Pamela Weston, *The Clarinetist's Companion,* (Corby: Fentone Music Limited, 1976), 30.

Figure 6: VPROSHOP, *Mouthpieces and Reeds*, Clarinet Mouthpiece Parts



Two hundred years ago, musicians and composers needed to travel long distances to hear how music was played in another country. Now it is not even necessary to go to the store to buy a recording, as it was customary only a few years ago. The volume and diversity of music from all over the world to which musicians and audiences are exposed is overwhelming. As a result, clarinet players gradually abandon regional practices and acquire international preferences of playing style and musical interpretation. The same applies to the clarinet systems and their uniqueness of sound. The system is hardly recognizable by the listener, not even a professional musician. This process may give rise to ambivalent feelings, pondering whether it is a positive or negative process. On one hand it is a shame to lose the richness and variety of local traditions. At the same time, as a player exposed to musical input from around the world, I cannot help but playing the way I like. Jochen Seggelke seemed to speak of the same ambivalence when asked about this topic. At the same time, he found reassurance in the uniqueness of players:

> Players will always be those who separate themselves, creating their own sound, using their own material combination, having another background, another education and other physicality. I hear every day what a broad spectrum of individual clarinet sounds

can be produced using the same instruments. So that although we have this great mix of materials and systems nowadays, there will always be personal unique sounds![24]

[24] See the appendix for a transcription of the interview. The interview was conducted in January 2015.

Conclusion

When I started this project, I assumed that the process of merging systems was something new that never happened before. However, looking at the historical context I realized that this process was in fact nothing but a continuation of what has occurred over the course of three hundred years: attempting to gain advantages from all developments in order to create increasingly better instruments that match the consistently increasing level of playing and the higher demands of compositions. The bond between player, composer and instrument maker is as significant today as it was the last three hundred years. It is still the basis of innovation. Jochen Seggelke gives an example of such process:

> Ernesto Mollinari is a composer and clarinetist who works with many highly interesting contemporary composers. He asked if I could make a better contrabass clarinet for him. My first reaction was "it's not possible." But from this moment I could not rest about this idea, and during a ski trip on the mountain I suddenly had an idea! A day later I met Mollinari, and a few days later he had the right person on the phone, so now we follow this idea that has to do with micro-technology and electronics, in order to guide the keywork. All starts from this interaction that causes development.[25]

There were and always will be matters of taste since music and art are subjective. Additionally, processes such as industrialization and wars have contributed to the now existing gap between clarinet systems. Stiff borders, existential hardship for small companies and different rate of production are some of the factors that contributed to the formation of the gap. These external factors postponed the natural process of innovation. However, due to the high exchange of information, and the collaboration of musician, composer, and instrument maker, which was so common throughout the clarinet's history, a slight closure of the gap is likely.

[25] See the appendix for a transcription of the interview. The interview was conducted in January 2015.

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Appendix: Interview with Instrument Maker Jochen Seggelke, 15.1.2015, Bamberg, Germany

File: **Interview with Jochen Seggelke**
Date: **Jan. 15, 2015**

Interviewer: Where did you learn instrument making?

Respondent: I started very late, because first I studied clarinet playing and had my "Diploma" (equivalent to today's Master's degree). Then I worked as a clarinet teacher near the Swiss boarder for a few years and only then started the apprenticeship in 1992 in Kronach, at the workshop of Guntram Wolf (http://www.guntramwolf.de/). He [Guntram Wolf] was a "self-made" bassoon and oboe maker and was happy to have someone who could introduce some knowledge about clarinet playing. I started by making period replicas, and that was the base for my modern clarinet making as well. I think period instruments are a very good pool of knowledge because the only possibility to create something which is working, is working on the bore and tone-whole positions and diameters. Therefore, you very quickly learn about the relations between these parameters. This helped me a lot to understand how the clarinet really works.

Interviewer: …Because you don't have such complex mechanics…?

Respondent: Yes! You are really focused on the basic thing—that's the corpus of the instrument. The normal education of woodwind-making nowadays is to learn how to make the mechanics. Almost nobody learns how to make the corpus, and only very few people have experience with these things, so in a way there is no tradition of knowledge about the most important things. The keywork is difficult to make, of course! It has to fit the fingers, but it has nothing to do with sound or intonation which are for me the most important parameters when I create a new clarinet.

Interviewer: What attracted you to this profession?

Respondent: I wanted to play period clarinets and needed a playable instrument. At the beginning of the 90s there where the replicas made by Rudolf Tutz (http://www.tutz.at/) which have been unachievable for me because of an extremely long waiting list (waiting time). At the same time, I happened to know a Japanese student in Basel who started making his own instruments in his apartment. I was astonished that this was possible because until then I used to think you needed a big workshop. I thought: if he can do this, I should also be able to. I did a lot of woodwork as a boy. Moreover, because of the quite unique clarinet studies at the Musikhochschule Heidelberg-Mannheim with Hans Pfeifer, which were more traditional, I had some practical experience at this point in, for example, reed making and mouthpiece corrections.

Interviewer: When did you start making your own instruments?

Respondent: During the two years at Guntram Wolf's workshop I made my first own instruments; these were period instruments. In 1994, I moved to Werner Schwenk in Tübingen and joined in to make the first modern instruments in 1995. In 1996, we created our Ottensteiner clarinet copy.[26] This was the first instrument Werner Schwenk and I made together and the basis for our modern clarinet.

Interviewer: What do you enjoy most in instrument making?

Respondent: A lot of things! One basic thing that has always attracted me a lot is the enrichment / enlargement of the clarinet family and working on new approaches to find better solutions. At the moment the project that occupies me the most is the contrabass clarinet. We search together with Ernesto Mollinari and the "Biel Hochschule für Mikromotorik." Also, just making "normal" clarinets to satisfy the regular player's demands at the highest level, that's something which I really like! The best moments are every week when players like their repaired or new instruments and can even see a certain development for themselves with the instrument. Helping to make an interaction between musician and instrument and perhaps [making] the music behind [it] a little better!

Interviewer: Are there parts you dislike?

Respondent: There might be some things that bother me such as not finding a solution even after years of research, but this is not boring for me. It can be difficult with certain kind of customers who are not understanding about our approach and do not realize why they are at the wrong place in our workshop (if, for example, for them we are not fast enough or not cheap enough, etc.). Or they ask me to do something that is not really possible and refuse to understand it. Another thing I must say I absolutely don't like is the office work, but it makes nearly 50% of my daily work. I always try to work longer at the workshop to make the balance better. But I accept that these are the "must-do" things that belong to a workshop with now ten to fifteen people. For this reason, I sometimes would like to go back to my own little room—"back to the roots"—but, of course, you immediately see the limits of that!

Interviewer: How many different models of instruments are you making at the moment?

Respondent: Seventy to eighty. It has to do with the fact that on one side we have a broad time range—historical instruments from Denner (1655-1707) up to the modern instruments including all the different pitches—and on the other side also the different bores and fingering possibilities. So it's a huge range of things, and you can combine everything with the other.

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[26] Georg Ottensteiner (1815-1879) was a clarinet maker. In 1860, he patented a new model together with the clarinetist Carl Bearman (1810-1885). He remains well known thanks of Richard Mühlfeld, who played on Ottensteiner's instruments and inspired Johannes Brahms to compose the Clarinet Trio, op. 114, Quintet, op. 115 and the Sonatas, op. 120.

Interviewer: What are the most commonly used (sold) models?

Respondent: Our "Volkswagen" is the model 1000 B-flat: French bore and fingerings, closely followed by the slightly more advanced model 1000+. Then, of course, our regular German instruments: model 2000 and the German bored instruments with French fingerings ("Reformed Böhm"): model 3000. In Germany, we sell more German instruments, of course, but also quite a lot of French [instruments] and not only those with German bore! Perhaps the reason we still sell quite a lot of French instruments in Germany is that our French instruments are also not very typical compared to the common industry-made [mass-produced] French instruments. There are a lot of reasons to tend toward handcrafted instruments. Also, the other way around: we do sell German instruments abroad. There are quite some players in America, Japan, Singapore, Holland, Turkey, etc.! We do not make them only for the German market. The relation is just about opposite, you could say 70-30 / 30-70.

Interviewer: When did you start making French and Reformed instruments?

Respondent: Since 1998/99, so about sixteen years.

Interviewer: Why?

Respondent: We wanted to be able to contact clarinet players abroad more easily. Our special way to make German-system clarinets is already far away from the traditional Oehler System, so at the start we had great difficulties to become a part of this market.[27] It was remarked very quickly that these (German) instruments "could be interesting." On the whole, the reaction was sceptical. I was just looking for more business possibilities and made at first a French-fingered instrument with a German bore. I didn't like the Reformed-Böhm instruments I knew, they felt very tight and limited. I wanted to get something which felt like our German instruments and would be free to blow. That was the first approach to French fingerings. From the experience of these first years I learned there are parameters [that] are very easily adapted by the players, but the finger habits are very hard to change. I accept that I have to follow the lead of industry-made instruments, and there are still more possibilities.

Interviewer: Is it an advantage or disadvantage to work on so many different models?

Respondent: Economically, it would be much easier to make fewer different models in larger numbers. I think the reason [why] this kind of handmade clarinet workshop exists is the idea [that] we have to follow every player's needs. It's a challenge to keep the balance between the economical musts: paying the people who work here, being able to react

[27] Oskar Oehler (1858-1936) was a clarinetist and clarinet maker who made significant improvements to the Baermann-Ottensteiner key system. The system improvements by Oehler are still featured in the vast majority of German-system instruments.

quickly enough to the demands of the players… and still preserve this flexibility.

Interviewer: Do you sometimes take ideas from one system and apply to the other models?

Respondent: Of course, I do this, and it has a lot to do with the possibilities I have as a clarinet player: you take any instrument and notice there are some incredibly nice notes. You want to know how they work so well and how to apply it [whatever makes these notes resonate so well] for the rest [of the instrument]. It's a very traditional way of research which is mainly trial and error, because there are so many things you cannot measure: the quality of the sound, or liking or disliking something; these things are very hard to measure! You need to observe very exactly and not only once, but several times. Compare your input, what you have heard, with experience and ideas. It's not very scientific.

Interviewer: What are the main differences in the structure of the three systems?

Respondent: In very few words, the difference between the French and the German system is that the G-major scale is the basic scale of the Germany system and the F-major of the French system. Basic scale means without using any "fork fingerings." I think that was initially the idea to use the French system: in the military use of the clarinet in the eighteenth century and later on, the tonality E-flat major plays a very dominant role (that is F major on the B-flat clarinet), so it should be easy to play! The basic difference of these systems is the character of the bore: the German system has a larger cylindrical part with a less conical end, at the flair. The French system has a narrower cylindrical part with a much longer conical part towards the end, so the flair can be up to three times the length compared to very traditional German instruments from the 1920s and 1930s. On these traditional German instruments (from the 1920s and 1930s), you have a cylindrical part which is close to 15 millimetres. French instruments have a cylindrical bore of about 14.5 millimetres, and the cone is up to the middle of the bottom joint (right-hand part). Because of this bore characters, you have different positions and sizes of tone holes. On the German system they are more guided towards the centre of the instrument. The German system also tries to get equal-sized tone holes as much as possible. On the French system, there are smaller holes at the top and big holes at the bottom. The sound character differences are: you have more fundamental ringing vibrations on the German system (GS) with some reduction of the higher harmonics. The harmonics of the French system (FS) are fewer on the fundamental frequency and get a bit more [increase] towards the higher frequency, so you could say different "vocals." Also, you can say that the GS doesn't change this vocal so much over the different registers, whereas the FS has a big difference between the low register and the upper registers.

Interviewer: How flexible are the bore sizes?

Respondent: This can be really scary! Some parts of the instrument should not be

touched, and others are less dangerous. The middle of the instrument should be very precise and well done. The ends towards the top or bottom you can change. One of my basic rules from the past, nearly twenty years ago, is that the top joint should end less large than the beginning of the bottom joint. If this is accepted by the maker, I would say the instrument works with any kind of mouthpiece. Otherwise, you will have big difficulties. This is just my experience; maybe some makers say the opposite, like always, but this is what I have seen through three hundred years of clarinet-making history. When the instrument is working well—no matter the size of the bore, the system, or register—the fix point for the clarinets is to be aware of the central bore, the connection point between the upper and lower joint. This is one of my few "red lines."

Interviewer: What are the most common problems you deal with daily?

Respondent: On the traditional B and A combination, we have this issue that both instruments should be similarly bored, but it is always a kind of a compromise which is not ideal for one or the other instrument.[28] The B and A instruments have different demands. I think most questions occur because of the different relations of the harmonics. You have the relation of the overtones: basic note, first over-blowing and second over-blowing. Some of these relations are different on the A and B, and I can dream every night on getting them to be the same! By the way, this issue is easier on any basset clarinet (basset horns etc.), but we want to have the character of the short clarinet. We want to have these ideas of the A for some music and B for other [music], so we have to look for some compromise for these questions.

Interviewer: So, they are mostly intonation and sound issues?

Respondent: Yes, these are the most delicate things. For all mechanical things, well, you shorten a key or make it longer / higher etc... basically there is a solution, but with these intonation things you risk a lot more. If you have gone too far, you could basically make a new instrument… sometimes you are really sitting on the edge! There is a demand of the player you want to help, but you know at the same time that this point is really scary.

Interviewer: Is there a general direction of merging the systems?

Respondent: For sure there is. First of all, we have many more possibilities to exchange, which is very important. We had a very strict border between Germany and France for decades: the river Rhein separated the clarinet playing in two halves of the world! Nowadays, it is almost like a non-existing border. The French really observe what we have done the last few years and we observe as well [what the French do], not as carefully maybe, but nevertheless. I always have this ambivalence inside because on one hand it would be nice to keep special traditions, having these

[28] "B and A instruments" mean, in common language, clarinets tuned in B-flat and A. These are the common sizes that a professional player owns.

significant sounds which you immediately recognize. This is already much less differentiated and will get more difficult in the future. On the other hand, some of the traditional approaches to play the clarinet seem so impossible from my own personal view that I absolutely don't want it even if this is part of the German tradition and is unique and interesting in a way. The same is true for French players. This is a question I also have when we play period instruments: trying to find out what could have been the sound of former days and the music of past time and composer. How could that [Instrument and style] have sounded? I'm sure there were certain concerts in history you wouldn't like to have taken part in if you just compare the possibilities of the instruments. This is a very difficult discussion because it has to do with taste, and that is influenced by many other things, not only by music. From this perspective it makes sense to keep so many different kinds of clarinets and to not have only the big worldwide mass-production companies. Also, the players will always be those who separate themselves creating their own sound, using their own material combination, having another background, another education and other physicality. I hear every day what a broad spectrum of individual clarinet sounds can be produced using the same instruments! So that although we have this great mix of materials and systems nowadays there will always be personal unique sounds!

Interviewer: In what way do players inspire instrumental changes and in what way do innovative instruments inspire players?

Respondent: Or composers…! For me it's a triangle. I see always the connection between composer, clarinetist, and instrument maker. This is something you see over the course of three hundred years of clarinet music: Mozart, Stadler and Theodor Lutz. They created a special piece with a special instrument and special performance (Clarinet Concerto, K. 622). More examples are: Brahms, Mühlfeld, and Georg Ottensteiner; Streitwolf, Spohr, and Johann-Simon Hermstett; Crusell (as a player and composer), and Heinrich Grenser. You will find this in any place in the world, and I'm sure the moment a player has a personal relation with his instrument maker, he will ask him for different things. As a result, the instrument maker will not sleep until he finds the solutions! The moment you speak about something, it's in the world. In the industry, you don't have the same possibility for that reflexion [contemplation]. My recent project with the contrabass clarinet is a good example: Ernesto Mollinari is a composer and clarinetist who works with many highly interesting contemporary composers. He asked if I could make a better contrabass clarinet for him. My first reaction was "it's not possible." But from this moment I could not rest about this idea, and during a ski trip on the mountain I suddenly had an idea! A day later I met Mollinari, and a few days later he had the right person on the phone, so now we follow this idea that has to do with micro-technology and electronics, in order to guide the keywork. All starts from this interaction that causes development.