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The "Modernity" of Saxophone Instruction in France: 1846-1942¹

Pascal Terrien²

Abstract

This article studies the contents of the saxophone methods written between 1846 and 1942, and attempts an epistemological investigation, seeking to determine whether their instrumental instruction was as innovative as the invention of Adolphe Sax. Towards that end, the author uses the tools necessary to define a disciplinary matrix of instruction, and analyzes the different elements that comprise the methods.

□ □

It was in a society in the midst of the Industrial Revolution that Antoine-Joseph Sax – better known as Adolphe Sax -- invented the saxophone and a whole family of instruments. In 1842, the year of Sax's arrival in Paris and the presentation of his invention to the Parisian music world, Hector Berlioz wrote:

The *Saxophon* [*sic*], named for its inventor, is a brass instrument similar in shape to the ophicleide and equipped with nineteen keys. It is not played with an embouchure, like the other brass instruments, but with a mouthpiece similar to that of the bass clarinet. The Saxophon could thus be the head of a new family of brass instruments with a reed.³

Thus, presented by the composer, this instrument promised a bright future to its creator. Today we know the difficulties that Adolphe Sax encountered in making his saxophone successful. An enterprising man and a genius as an innovator, Sax offered to the instrumental world a tool of incredible modernity imbued with an enormous range of possible sonorities, as described below by Fétis:

The initial idea, whose corollaries were progressively derived, was the conception of instruments of every kind of sonority in complete families of first and second sopranos, contraltos, baritone, bass and contrabass.⁴

The 1846 patenting of the saxophone was followed in the same year by the first instrumental methods books, so that instruction could be developed. Kastner, Hartmann, and Cokken all published their methods practically at the same time.⁵ The first, Kastner, also a composer, described as a man of science, and a close friend of Sax,⁶ would write his method

¹ The article was translated by Sylvia Kahan, Professor, College of Staten Island and The Graduate Center. It is taken from the book *A history of the Saxophone through the pedagogical methods published in France: 1846-1942*, Editions Delatour France, 2015.

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³ Hector Berlioz, "Instrumens de musique. M. Ad. Sax," *Journal des débats politiques et littéraires* (12 June 1842), 3. In the title of the article, Berlioz (mis)spells "instruments" as "instrumens." We have retained this fanciful spelling.

⁴ François-Joseph Fétis, "Antoine-Joseph Sax," *Biographie universelle des musiciens et bibliographie générale de la musique*, 2nd edition (Paris: Librairie Firmin Didot Frères, 1866), 415.

⁵ See the articles by Jonathan Robert and Clément Himbert in this volume.

⁶ Georges Kastner, "Avant-Propos," *Méthode complète et raisonnée de saxophone* (Paris: Troupenas, 1846). Kastner writes, " But in order for our method to have real value and unquestionable usefulness, it was necessary

under the guidance of the inventor; the second, Hartmann, was a clarinetist⁷; the third, Cokken,⁸ was a bassoonist and a professor at the *Gymnase musical militaire* before becoming, in 1852, professor of bassoon at the Paris Conservatoire.⁹ The methods by these men were all named "Complete Saxophone Method"; the objective of each was "to facilitate access to the saxophone by all artists who would like to play it, and to popularize its use, in every genre of composition."¹⁰ Even so, the recent research carried out by our team, and the observations and analyses of the methods' contents, raise questions about the ideas of modernity contained in these methods, published between 1846 and 1942. If the last-published methods correspond with our expectations of modernity, especially in relationship to the other educational materials written during their period of publication, we will investigate, in this article, if the innovations that they brought to student musicians are of the same importance as those brought by Adolphe Sax's invention in the field of instrumental manufacturing.

To respond to this problem, we borrow a theoretical framework that makes an attempt at some initial epistemological thinking on the history of the saxophone with the help of a tool that modern didacticians use: a disciplinary matrix. Once this framework is defined, we will analyze the innovations of Sax's invention to put them in relationship to the contents of the methods written for the instrument. In a second section, we will attempt to isolate the paradoxes between instrumental innovation and "pedagogical" conservatism -- that is to say, the revolution "missed" by the first "saxophonists" in the establishment of a new instrumental paradigm. This line of thought is based on a theory of didacticism in musical instruction.

I. The Epistemology¹¹ of an Instrument

I.2. History of Saxophone Instruction and Its Theoretical Foundations¹²

Saxophone teaching expanded rapidly in 1846, the same year as the filing of the patent. A new instrument, with novel sonorities: one could naively think that the inventor and his admirers would create methods or other pedagogical works that were as innovative as the invention promised to be. However, let us not forget that the saxophone came into being following numerous improvements that Adolphe Sax had already made on another instrument that proved to be a sort of family ancestor: the bass clarinet. We are in a universe rather far from that of Theremin, Martenot or Moog, who, starting with objects apparently far-removed from music, nonetheless created instruments with new sounds. Even so, the saxophone represented in its time a scientific, organological and musical revolution that impressed music

that certain documents contained within be obtained from the best sources. Now, what better man than Monsieur Adolphe Sax himself, to remove our doubts, clarify our uncertainties, in sum, direct our efforts in the accomplishment of a task of this nature? It is not only as an inventor that we felt the need to consult Monsieur Adolphe Sax, but also as an artist: he plays his instrument, and, as a consequence, he knows all its properties; and we do not conceal his insights -- we have had great assistance in this work." Quoted in Clément Himbert, "Fondements historiques de l'enseignement du saxophone en France: usages et évolutions," *mémoire* for the Certificat d'Aptitude (2010), 124, Département formation à l'enseignement, Conservatoire national supérieur de musique et de danse de Paris.

⁷ Hartmann, Aîné, *Méthode élémentaire de saxophone contenant le doigté, la tablature position du corps, gammes exercices, leçons airs et duos*, (Paris: Schonenberger, 1846), 75.

⁸ Jean-François-Barthélémy Cokken, *Méthode complète de saxophone* (Paris: Meissonnier et Fils, 1846), 120.

⁹ See the article by Bertrand Hainaut in this volume.

¹⁰ Kastner, "Avant-Propos" (1846).

¹¹ *Episteme*: sciences; *logos*: language, speech; *epistemology*: critical study of sciences intended to determine their origin.

¹² Numerous works recount the history of the instrument. We invite the reader to consult the General Bibliography at the end of this volume.

intellectuals by virtue of Sax's solutions to some of the acoustical and technical problems posed by the clarinet. These solutions represent an innovation that was lauded by musicians from the first moments of its existence.

So, when we speak of Sax's invention, we are speaking of science. Like every other scientific revolution, the invention of the saxophone was based on a group of "facts, theories and methods collected in current texts,"¹³ and the scientific development represents a piecemeal process of elements added "singly and in combination to the ever growing stockpile that constitutes scientific technique and knowledge."¹⁴ To study the history of the saxophone is to analyze the scientific principles, fundamental concepts, and theories and modes of inference that comprise the epistemological approach to the invention. Delving into the epistemology of the saxophone is also to "implement a theory of the knowledge and its validity."¹⁵ In that sense, the different articles in this volume contribute to the epistemology of the instrument.

Sax's invention represents the accumulation of technical responses to questions raised by his work on the clarinet. His scientific thinking in the fields of acoustics and the physics of sound, but also in the mechanical and organological fields, enabled him to improve an existing instrument, and to create a bass clarinet that would earn him the admiration of the musicians of his era. Fétis wrote: "We are indebted to M. Adolphe Sax for the improvements that are noticeable today: [the bass clarinet] that he built in Brussels eighteen years ago has become the model for all the others."¹⁶ The saxophone, as Berlioz reported in the *Journal des débats* of 12 June 1842, is at once the fruit of the thinking that Sax was able to bring to the brass family of instruments and jointly to the clarinet. In that sense, the saxophone represents a scientific revolution, for it united the advances brought to brass instruments and single-reed woodwind instruments in the fields of acoustics, physics of sound, materials, mechanisms, and modalities of playing.

I.2. The Disciplinary Matrix

The newly invented instrument had to become widely known in order for its use to be developed and to be commercialized. Its inventor was also a manufacturer and an industrial entrepreneur: he needed to make and sell his instruments to grow his business. Scientific and economic reasons went hand in hand: the viability of a discovery was tied to instrumental manufacturing. In this respect, the steps taken by General de Rumigny, Minister of War in the Guizot government -- such as the organization of the 1845 military music competition at the Champs de Mars, attended by more than twenty thousand people -- demonstrate Adolphe Sax's entrepreneurial spirit and audaciousness.¹⁷

However, we are more interested in the history of saxophone instruction between 1846 and 1942. To better understand its genesis and evolution, we rely on a study procedure that Kuhn calls the "disciplinary matrix" (formerly called a paradigm¹⁸), which delineates three theoretical fields of knowledge: acoustics and the physical laws of vibrating bodies,

¹³ Thomas Kuhn, *The Structure of Scientific Revolutions* (Chicago: University of Chicago Press, 1962, 2012), 2. Kuhn's thesis on revolutions is used here because it illustrates perfectly the steps followed by Adolphe Sax during his lifetime.

¹⁴ Ibid.

¹⁵ *Le Petit Robert* (Paris: VUEF, 2002), 926

¹⁶ François-Joseph Fétis, "Fabrication des instruments de musique," *Rapport de jury de l'Exposition Universelle, en 1855* (Paris, 1855), 10.

¹⁷ Numerous eyewitness accounts of this event exist. For the purposes of this article, we refer to Fétis's article on the event, which appears in his *Biographie universelles des musiciens*, 417.

¹⁸ For Kuhn, paradigms are "universally recognized scientific achievements that for a time provide model problems and solutions for a community of practitioners." Kuhn, *The Structure of Scientific Revolutions*, viii.

organology, and the history of instruments. Each of these fields allows verification of the coherence of the world scientific community around the saxophone: to sum up briefly the main aspects of Kuhnian epistemology, the paradigms serve as a collection of shared group commitments to the same rules and standards; they are considered as common examples, understood tacitly by the institution. This concept is used as a measuring tool for an approach to teaching methodology introduced by Michel Develay¹⁹ and expanded upon by Eirick Prairat in a short article upon which a scholarly discipline was founded.²⁰

According to Eirick Prairat, "A disciplinary matrix is that which defines and gives coherence to a scholarly discipline."²¹ We consider that from the moment when authors write methods for instrumental practice, they create didactic and pedagogical tools²² intended for use with students. These methods represent the fruit of their experience with and/or their thinking about instrumental practice²³ at a given moment in their career. A method will demarcate, for a time, the evolution of an instrumental practice, which will certainly evolve, but which, because written down, is permanently formalized — indeed, "frozen"²⁴ — and is thus representative of its era. Methods teach us about the intellectual ideas of the time periods to which they belong. What seems to us most interesting in these methods are the formalized traces of practices at a given moment, for they reveal a coherence both in the fields of technical and social practice, as well as in that of music. The methods attest to instrumental techniques developed at a particular moment, but they also attest, through exercises, repertoires, works and styles, to musical practices: it is through these practices that they codify the instruction of the discipline. The saxophone methods written between 1846 and 1942 conform to this rule, as has been demonstrated by the analyses in this volume's preceding articles.

A disciplinary matrix is thus a frame of reference, a point of view or an underlying ideology and a signifier of consistency. In this period, 1846-1942, the referential framework for the saxophone methods generally appears right at the start, in the prefaces. They summarize the writings and principal methods of Adolphe Sax and offer a summary of his scientific discoveries. But they also recall, generally from the very first pages, the rules that constitute the theory of music. Within this double tract of theoretical and technical references, the practice of the instrument is inscribed in a history that is the outcome of different discoveries, but which is also anchored in an instrumental practice linked to the clarinet, and sometimes to the flute and bassoon — although, as we can observe in this article, this is not always made explicit. Thus, through these methods, we can see the authors' different points of view and ideologies; these take shape through the insertion of little phrases or maxims that characterize the thinking of the times and that have been propagated over the years -- but without explicitly tying this ideology, at the core, to saxophone instruction. Often, the student -- and sometimes the professor -- do what is indicated in the method because the original authors did it that way. The coherence of the disciplinary matrix rests on the different elements of the frame of reference: here, generally speaking, the history of the instrument and the rules of solfège; or the ideology

¹⁹ Michel Develay, "Discipline et matrice disciplinaire," *Cahiers pédagogiques*, no. 298 (November 1991): 25-27.

²⁰ Eirick Prairat, "Qu'est-ce qu'une discipline scolaire?," *Éducatons* 7, no. 8 (January-February 1996): 29-33.

²¹ *Ibid.*, 30.

²² Today, we consider that educational science and didactical study of an instructional object precede the course and possess their own analytical tools, while pedagogy takes place at the moment when the instructor and the students share this instructional object. See Pascal Terrien, "Pour une didactique de l'enseignement musical," *Les didactiques en question, état des lieux et perspectives pour la recherche et la formation* (Brussels: De Boeck Université, 2012), 170-80.

²³ Later on in the text we refer to "procedural knowledge" for experiences and "declarative knowledge" for thinking about a practice. On this subject, see the chapter by Jacky Beillerot, "Les savoirs, leur conception et leur nature," in *Pour une clinique du rapport au savoir*, ed. Jacky Beillerot, Claudine Blanchard-LaVille, and Nicole Mosconi (Paris: L'Harmattan, 1996), 119-43.

²⁴ On this point, we argue that even re-publications of existing methods or improvements of these methods, made through revisions by the original authors or different authors, do not change the paradigms of the writings.

of the author, including whether he was a clarinetist, bassoonist or flutist; and later on, whether he belonged to the Conservatoire, the music ensembles of the Garde Républicaine, or some other music institution, or two . . .

Thus, the disciplinary matrix takes shape as an epistemological unity through the objects, the tasks, the procedural knowledge and the declarative knowledge that links instrumental practice to a given moment in time. According to Prairat, "the objects materialize the discipline"²⁵; it is these objects that define the discipline in the first place: the saxophone (the instrument), the method -- but also the reed, the music stand, etc. Some of these objects come from the social world (the music stand), others are common to several disciplines (the method book, the reed, the keys), and others can be more specific to the discipline (the saxophone embouchure, the body of the instrument). Finally, the purpose of the tools must be distinguished: first, we practice the exercise or on the piece; secondly, we work with the saxophone, or with organological specifics to obtain an effect or sonority (*slap*, flutter-tonguing, etc.). From the objects we proceed to the tasks to be realized: breathing in and out, moving the fingers, having a good posture, reading music, improvising, etc. A task reveals an underlying knowledge: breathing out indicates breathing in, but says nothing about how one breathes, which is also a skill. How does one breathe out well if one knows nothing about the mechanics of breathing? And how can an instructor teach this concept if s/he knows nothing about it? Prairat writes, "A scholarly discipline always appears to be a series of tasks that one must know how to accomplish."²⁶ In the methods, it is a series of technical, musical and performance skills that are described and expected to be accomplished. And yet, their foundations are not always made explicit, which will pose certain difficulties sometimes to the student and/or the professor. For, generally, procedural knowledge is described and implemented without the necessary expertise and scientific bases. Instead, "empirical" expertise is drawn from experience or the habits and customs of instrumental practice. Its value comes from what, at one moment or other, can be made explicit with as much precision as possible and a degree of validity. This degree of validity, shared by the members of a community, gives coherence to an instructional practice, and establishes its disciplinary matrix. Later in this article, we will analyze some examples of declarative knowledge that have become the basis of saxophone instruction, without necessarily being scientifically well grounded.

In terms of both content and form, the methods were an important part of the history of the instrument, because they formalized practices, expertise, and certain behavioral skills at a given moment of the saxophone's historical evolution. At the same time, they "popularized" the pedagogical concepts and musical skills, and could sometimes pervert them, excessively simplifying the lessons, because the authors had not sufficiently mastered the level of knowledge and expertise necessary for their instruction. The methods accordingly also fostered instruction based on distortions of beliefs and ideologies about the manner of playing the instrument that, for a time, were prevalent in saxophone circles.

II. The Innovations of Adolphe Sax and the Contents of the Methods

M. Sax [père] discovered the laws that no treatise of acoustics could teach him; for, it must be confessed, the learned works of the Bernouillis²⁷ [*sic*], the d'Alemberts, the Eulers, and even the

²⁵ Prairat, "Qu'est-ce qu'une discipline scolaire?", 31.

²⁶ *Ibid.*, 32.

²⁷ Daniel Bernoulli (and not "Bernouilli," as it is erroneously spelled in many sources) (1700-1782) was a Swiss doctor, physicist and mathematician, and inventor of the fundamental theorem of fluid mechanics that bears his

Lagranges have but little utility for instrument making. Their theories of sound and their calculations could never guide Sax père in the puncturing of extracylindrical tubes (Report on the Exhibition of French industry, in 1830) . . . M. Sax overturned, from top to bottom, the current system of brass instruments. From his re-melted debris he gave birth to two new families of keyed instruments, in brass and in wood, whose weakest parts were superior to the best parts of the others. The sounds were fuller, stronger and perfectly even, allied to an economical key system and a wider range of the chromatic scale. This system contained a whole series [of instruments], from the smallest bugle or keyed trumpet up to the ophicleide. The alto, bass, contrabass and subcontrabass offered unknown sounds, filled with new colors.²⁸

It is with these lines written by the acoustician Savart²⁹ that Fétis concluded his article on Adolphe Sax's father, Charles-Joseph, himself a manufacturer of instruments in Brussels, and who received an award at the 1835 Brussels Industrial Exhibition for his acoustical discoveries related to brass instruments. Adolphe Sax's father had already begun "the puncturing of extracylindrical tubes" and had improved the system of keys for these instruments. However, it was Adolphe Sax who developed the parabolic cone of the saxophone's bore, about which Fétis writes in his *Biographie universelle des musiciens et bibliographie générale de la musique*:

No sooner had Sax completed his acoustic reform of the clarinet, a moment of clarity borne of his genius made him foresee the possibility of applying the system of vibratory movement of this genre of instrument to a new form of brass instrument, for the bore of which he adopted the parabolic cone. It is this same instrument, one of the most wonderful inventions and without doubt the most original, to which he gave the name of saxophone.³⁰

II.1. The Innovations of Adolphe Sax

Historically speaking, it was Fétis who precisely established the history of the saxophone: that was in 1855, in his well-known report on the *Fabrication des instruments de Musique [Construction of Musical Instruments]*, in which he revealed the saxophone with a description of the instrument, subsequently reprinted in his *Biographie universelle des musiciens et bibliographie générale de la musique* :

COMPLETE FAMILY OF SAXOPHONES

We approach this family of instruments, invented by Adolphe Sax, from the family of clarinets, because the producer of sound is, like in the clarinets, a vibrating reed against the table of the mouthpiece; but the acoustic conditions are absolutely different in the construction of the tube in these two families.

The saxophone is a parabolic cone in brass, in which the intonation is modified by a system of keys. These keys number between 19 and 22, according to the individual members of the family. Essentially different from the clarinet by virtue of the vibrational nodes in its air column, the saxophone is tuned in octaves in such a way that all the octaves are accurate in intonation, which doesn't happen on the clarinet. We add, however, that in a good part of its range, it has the possibility to create the harmonic at the twelfth, or an octave above the fifth.

The instrument can be played easily, because the fingering, similar to that of the instruments that create octaves, is not so different from that of the flute or oboe. Clarinetists can learn to play it in very little time, because of the similarity to the embouchure of their normal instrument.

name. The misspelled last name "Bernouilli" continues to be found in numerous sources on the relationship of the theorem to the saxophone mouthpiece.

²⁸ François-Joseph Fétis, "[Charles-Joseph] Sax," *Biographie universelle des musiciens et bibliographie générale de la musique*, 2nd edition (Paris: Librairie Firmin Didot Frères, 1866), 413.

²⁹ Félix Savart (1791-1841), surgeon and sound physicist, was elected to the Académie de sciences in 1827.

³⁰ Fétis, *Biographie universelle*, 414.

The sound of the saxophone is the most beautiful and the most pleasant that one can hear. Its timbre is unlike that of any other instrument. Melancholy, it is best adapted to the voice or the wind orchestra than to rapid passagework, although its articulation is very quick, and we have heard the most skillful clarinetist Wuille perform a solo filled with great difficulties on the saxophone, with much success. Able to perform all nuances of intensity, the saxophone can go from the softest pianissimo to the most energetic and powerful sound.

This wonderful instrument, whose many resources we had not fully grasped until now, is part of a complete family, divided into eight varieties, all of which are at the fifth or the octave of the others. The individual instruments in this family are arranged in this manner:

1. high [sopranino] saxophone in Eb (chromatic range of two octaves and a third);
2. soprano saxophone in C or Bb (same range);
3. alto saxophone in F or Eb (chromatic range of two octaves and a fifth);
4. tenor saxophone in C or Bb (same range);
5. baritone saxophone en *fa* ou en *mi* bémol (same range);
6. bass saxophone in C or Bb (same range);
7. contrabass saxophone in F or Eb (chromatic range of two octaves and a second);
8. [sub]contrabass saxophone in C or Bb (same range);

Careful examination of the saxophone family reveals facts of high importance; for this instrument is new, in the proportions of its tubes, its bore, its embouchure, and especially its timbre. The family is complete, for it encompasses eight varieties, from high to low, which, as a group, incorporate the whole range of perceptible sounds. Finally, it is perfect, whether we consider it from the point of view of intonation and sonority, or in its mechanism. All other instruments have their origin in the mists of time; all have undergone notable modifications throughout the ages, and, in their migrations, all were improved by slow progress. This one, on the contrary, was born yesterday; it is the fruit of a single conception, and, from its first day, it was the same instrument that it will be in the future. The jury can only but praise M. Adolphe Sax for such a wonderful discovery.³¹

This report can be considered as the founding act, epistemologically speaking, in the history of the saxophone. With the 1866 article on Adolphe Sax in the *Biographie universelle des musiciens et bibliographie générale de la musique*, François-Joseph Fétis³² laid the groundwork for the historical and theoretical framework that Jean-Pierre-Oscar Comettant³³ would complete in his 1860 work on Sax. François-Joseph Fétis, composer, musicologist, professor of composition, then librarian at the Paris Conservatoire, named in 1833 director of the Brussels Conservatoire, became the face of the scientific endorsement necessary to found an epistemology of the saxophone in this time period. He was one of the privileged witnesses to the birth of the instrument. Like the inventor, he was Belgian; and, especially, he was recognized by the whole profession as a music historian and a composer. The other scientific endorsement was that of Jean-Georges Kastner (1810-1867), one of Sax's very first supporters in Paris. This composer of numerous operas was also a remarkable theorist, to whom we owe the first French *Traité général d'instrumentation* [General Treatise on Instrumentation]³⁴ (1837), and a respected musicographer. His writings had a real scientific value during their time. Fétis and Kastner represented the endorsement of scientists. Among composers, the

³¹ François-Joseph Fétis, "Famille complète des saxophones," excerpt from "Fabrication des instruments de musique," *Rapport de jury de l'Exposition Universelle, en 1855* (Paris, 1855), 11.

³² François-Joseph Fétis, (1784-1871), Belgian composer and musicology, director of the Conservatoire royal de Bruxelles.

³³ Jean-Pierre-Oscar Comettant (1819-1898), composer, critic and musicographer.

³⁴ Jean-Georges Kastner, *Traité général d'instrumentation* (Paris: Prilipp, 1837); supplement, 1844.

reputation of the saxophone was established with the support of Berlioz, Halévy, Habeneck, and Rossini, to cite but a few, and Kastner, who would write a part for the instrument in his opera *Le Dernier roi de Juda* (1844). Among performers, Adolphe Sax could count quickly on Wuille, Klosé, Hartmann, and Cokken to champion him from the first days of the instrument.

With scientific and musical endorsement established by the writings of Fétis, it is interesting also to study the scientific framework that supports the thinking of the instrument's champions. Sax's work goes above and beyond knowledge of acoustics and the laws of sound physics, facts to which Savart attests in Fétis's article.³⁵ The extracylindrical bore of the brass instruments of Sax père, associated with the parabolic cone of the son and the instrument's key positioning resolved the problems of intonation created by the clarinet and allowed for playing the interval of the octave thanks to the vibrational nodes of its air column. But, curiously, Fétis didn't dwell on the mathematical elements or the laws of sound physics. The conical shape of the tube is described *ad minima*, but he assures readers that the intonation, the sound quality, and "the intensity of the dynamics," allow the player to go from "the most absolute *pianissimo* to the most energetic and powerful sound."³⁶ The novelty of the instrument is borne out by "facts of high importance"³⁷: the proportion of the tube, the bore, the embouchure and the timbre. The saxophone is a "complete" instrument because it belongs to a family of eight. Finally, it is "perfect" by virtue of its intonation, its sonority, and its mechanism.

If, as Fétis himself remarks, a number of innovations had been gestating for several years, it takes nothing away from the revolution that the saxophone brought to the world of instruments, and doesn't minimize the importance of the discovery. Departing from the conical shape, Sax père had, it seems, already made significant progress in the 1830s on his brass instruments, as Fétis himself attests. The progress achieved on the bass clarinet, in terms of intonation, evenness of sound and keywork, was lauded at Belgium's 1835 Industrial Exhibition. Sax fils finished the reform of the instrument in 1840, having already obtained a patent for ten years in 1837, which resulted in Habeneck's introducing the instrument in the orchestra of the Opéra de Paris. As regards "fingering," Sax's knowledge of the flute and the clarinet could only help him to improve the instrument's keywork. His real innovation was the saxophone's intonation and evenness of sound; these were the result of calculations of the length of the conical bore, so that the vibrational nodes allowed for the octave and even the harmonic of the twelfth (the octave of the fifth).

The various articles by Fétis enabled the saxophone to be recognized as a "scholarly" instrument in its own right, because Fétis's writings were supported by the testimony of scientists, references to the laws of physics linked to the conical bore, the vibrational nodes, and the quality of the metal or material -- in this case, a metal alloy with a brass base. These same concepts of conicity, intonation, evenness of sound, and gradations of intensity, served an ideology that defenuded the instrument against its detractors. They gave coherence to the discourses on the saxophone, which included the similarity of the instrument's fingerings with those of the flute and oboe, and of its embouchure with that of the bass clarinet. It is true that the first saxophone, patented on 22 June 1846, is close to the bass clarinet. Therefore, it can be asked why the saxophone didn't enter the orchestra -- and why it almost vanished during the 1900s in Europe. Were so many innovations found in its instruction? Or was it possible that the instrument's instruction and especially its methods restricted its development and its integration into the orchestra? Fétis's phrase, written in his 1855 report, "This wonderful instrument, all of whose resources we didn't fully grasp until this moment," became prophetic and proved to be exact.

³⁵ Fétis, *Biographie universelle*, 413.

³⁶ Fétis, "Famille complète des saxophones," in *Rapport de jury* (1855), 11.

³⁷ *Ibid.*

II.2. The Contents of the Methods In Light of the Disciplinary Matrix

It is necessary to view the disciplinary matrix as a tool employed in the service of converting an epistemological investigation into a research topic. Our topic is the saxophone methods published in France between 1846 and 1942. The disciplinary matrix rests on four distinct elements that we presented above: objects, tasks, procedural knowledge and declarative knowledge. We had previously posed the hypothesis that the disciplinary matrix allows for the elaboration of an epistemology of saxophone instruction, that is to say, a theory of expertise and science, which structures the concept in order to better know its genesis, and to better understand the "revolution" that the saxophone introduced in the world of instruments. It concerned the validation of the idea of revolution in an instrumental and musical universe, an idea championed and supported by the men of science and art of the period. Epistemologically speaking, the history of the saxophone rests on studies of acoustical order and the physics of sound, on new organological elaborations linked to matter, mechanisms, material, embouchure, and, finally, to that which assures the durability of an instrument in the ideology of the period: the constitution of family of instruments. This idea was supported, in particular, by Fétis.³⁸ As regards instrumental technique, we offer the hypothesis that, for a new instrument and a new pedagogy, study of the methods should allow us to observe whether or not a new pedagogy appeared with the new instrument. If a new pedagogy is born, it appears through objects, tasks, procedural and declarative knowledge that define a disciplinary matrix. The disciplinary matrix informs us about the ideas of the time period when the methods were written. The elements upon which the modernity of the saxophone was based — the conical shape, the intonation, the acoustical performance of the instrument — should be "didacticized" in order to permit innovative instruction; this is a hypothesis that we can pose.

The scientific and musical communities legitimized the new instrument, fostering its development. Its instruction similarly should have established its reputation because of the excellence of the musicians who provided it at the beginning. Before examining more precisely the contents of these methods, we will consider briefly the authors of these methods. We recall that the first three saxophone methods were written by Kastner (a composer and musicologist), Hartmann (a clarinetist), and Cokken (a bassoonist);³⁹ and that the inventor of the instrument was himself a flutist and clarinetist before becoming a saxophonist.⁴⁰ Such was the instrumental origin of the first generation of authors of saxophone methods. The clarinetists would dominate the world of publication for the saxophone through the first decades of the 20th century.⁴¹ From that fact, our hypothesis that saxophone instruction was, from the beginning, more influenced by instrumental practices belonging to another instrument than by the innovative elements offered by the saxophone itself seems reasonable. We will verify this in our observations through the study of the objects and tasks contained in the methods.

Moreover, it is no less significant to recall that while certain authors belonged to the academic world, the Conservatoire and the orchestra (e.g. Cokken, Klosé, Mayeur), others, especially for the second- and third-generation saxophone methods,⁴² were principally military men or members of civil wind orchestras, before also becoming, in the fourth generation,

³⁸ Fétis, *Biographie universelle*, 415.

³⁹ On the different periods of publication of saxophone methods, see the articles by Jonathan Robert and Clément Himbert in this volume.

⁴⁰ Fétis, *Biographie universelle*, 413.

⁴¹ On the relationships between clarinetists and saxophonists in the 19th and 20th centuries, see the article by Bertrand Hainaut in this volume, especially as regards Hyacinthe Klosé.

⁴² See the articles by Jonathan Robert and Clément Himbert in this volume.

popular-music artists playing in dance-hall ensembles or jazz bands — which by no means devaluated the practice of the instrument. We will find traces of the status of the musicians in the expression of the procedural and declarative knowledge of the methods.

The structure and the content of the methods can be described as generally the same during the period that interests us: a history of the instrument and its inventor; a description of the instrument; a few ideas or reviews of solfège (or an indication that solfège should be mastered); scales and études; pieces belonging to "major repertoire" or specially composed for the instrument, or composed for such and such a difficulty tied to its execution; and finally, based on the professional activity of the musician, recommendations concerning the posture of the instrumentalist and the manner of playing it. Concerning the history of the instrument, the source is always Sax himself, be it through direct reference (Kastner, Fétis) or borrowing of the first writings on the instrument by these same authors. In this way, the idea of "revolution" quickly became anchored in the minds of musicians.

But let us return to the contents of the methods and we will interest ourselves in the objects and tasks that constitute them. As we defined them earlier in this text, the objects give substance to the discipline. While a number of them are common to many disciplines (e. g. the instrumental method as a manual for learning), others are specific to the instrument - for example, the body or the mouthpiece of the saxophone. Thanks to the uniqueness of its parabolic cone and to the characteristics of its mouthpiece, these technical and scientific advances and discoveries created a Bernoulli effect,⁴³ which plays an active role in the sound production. Its other elements (e. g., the keys and the reed) are common to other instruments, even if in their realization they possess their own characteristics as regards the saxophone, as shown in the advice given by Mayeur in his 1868 method.⁴⁴ This observation describes the objects specific to the saxophone, those that characterize it, and others that belong to the history of instruments and objects that come from the social world, in the sense that their use is already known and used by others.

But they can also have been thought of and realized with the sole goal of instruction. Scales and interval exercises are common to all instrumental learning, and, from this fact, belong to the social world and the pedagogy of the era. There are also transcriptions of works from the "major repertoire," which are generally found at the end of the methods: excerpts from Mozart, Haydn, Rossini, Méhul, etc. There are also works written specially for the instrument, like the Kastner Sextet and works commissioned later written by Debussy, Glazunov, and Ibert, to name just a few. But for those we had to wait until the beginning of the 20th century.

We generally distinguish between objects "which call for work on" from tools "which call for work with."⁴⁵ In this domain, saxophone instruction doesn't differ from that of the other instruments; to attain relative mastery, indeed, a degree of virtuosity, the saxophonist should practice exercises adapted to the practice of his instrument that will allow him/her to master its technical and musical aspects. Thus, the exercises based on scales, articulations, intonation, ornaments and styles are present in the group of methods, with a mouthpiece and reed adapted to the instrumentalist, with or without the lips on the teeth, as is the case in Kastner.⁴⁶

⁴³ See the article by Gilles Tressos in this volume.

⁴⁴ Louis Mayeur, *Grande méthode complète de saxophone* (Paris: Léon Escudier, 1868), 7.

⁴⁵ Prairat, "Qu'est-ce qu'une discipline scolaire?", 29, note 749 and page 30, note 750.

⁴⁶ At the time that Kastner wrote his method (1846), the saxophone mouthpiece was a clarinet mouthpiece; thus, the saxophone used the technique of the clarinet. This practice declined after 1868, when Mayeur specifically forbade the practice in his method. See Mayeur, (1868), 141.

Thus, for the didactician of the saxophone, some thinking about the content of the objects that form the basis of instrumental instruction reveals what is borrowed from the social world and the general history of music and what is specific to it.

What the student should achieve is that which characterizes the task. The exercises written in the saxophone methods are often linked to the practice of another instrument: the clarinet. For many of these methods, the first versions are intended for beginning musicians, but not complete novices. A substantial number of these new saxophonists were former clarinetists, flutists, and bassoonists. Their musical knowledge was useful in that they learned the new instrument with the habits associated with the older ones. The foundation of the saxophone's technical exercises did not differ much from that of the clarinet, whose embouchure was similar, or of the flute, whose proximity of fingering was borne out in Fétis's 1855 report:

The normal position of vibrational nodes depends upon the position and the size of the holes, from whence results the accuracy of the intonation of the chromatic scale. Thus we are able to attain the definitive goal of a regular fingering for the production of this scale; closer to the *fourche*, that is to say the open hole between two blocked holes; more of a half-hole . . . For the ascending scale, the fingers of the two hands are raised and uncover the holes, in following them in natural order, from the extremity of the instrument up to the embouchure. For the descending scale, the fingers cover the holes in reverse order. Thus the intonation, the beauty of the sound and ease of fingering are the results of the reform.⁴⁷

If saxophone instruction became innovative, it was through this idea of "task." But, as has already been pointed out, the tasks that the saxophonists had to perform were created in the image of those already familiar to clarinetists and other woodwind players. This statement is corroborated by the contemporaneous publication of the methods intended for multiple wind instruments. A few instrumental specificities were linked to the production of a sonority peculiar to the saxophone; and yet, students didn't seem to be up to the challenge, given the noticeable absence of virtuosos at the end of the 19th century. It was necessary to wait for the arrival and assimilation of jazz into the French musical world for the instrument to find favor with amateur and professional musicians. As Rorive states in his work,⁴⁸ the use of the saxophone as an orchestral instrument was most often confined to non-specialized woodwind players, whether for economic reasons, or for reasons of technical deficiencies in saxophonists.

The rigorous, precise work of different exercises written in the methods, often drawn from practices linked to clarinets, is borne out by the comparison of Hyacinthe Klosé's 1843 method for clarinet and his method for saxophone, published in 1868.⁴⁹ Technically and musically speaking, the parallels were confirmed. Sometimes these led to "faulty" performance practices, which continued even when the instrument, or one of its parts, was modified (e. g. the lips on the saxophone mouthpiece). The sound production, which should have been the most innovative part of these methods, was practically never discussed, while from the beginning Berlioz, Kastner, and then Fétis dwelt upon the powerful originality of the instrument's sound, which Fétis did not hesitate to compare to the voice.⁵⁰

The group of tasks that the saxophonist was supposed to accomplish seemed applicable to any woodwind player, at least in the first publications. They are better distinguished in the methods published during the years 1920-1940, especially with the contributions of jazz and popular music, whose players brought new modes of performance vastly different from those

⁴⁷ Fétis, "Fabrication des instruments" (1855), 53.

⁴⁸ Jean-Pierre Rorive, *Adolphe Sax (1814-1894), inventeur de génie* (Brussels: Racine, 2004), 249-62.

⁴⁹ See the article by Bertrand Hainaut in this volume.

⁵⁰ Fétis, "Fabrication des instruments" in *Rapport de jury* (1855), 11.

inherited from the milieux of classical or military musicians. The new ways of playing created acoustic effects specific to the instrument and emphasized all of its sonic modernity.

It is here that procedural knowledge and declarative knowledge are the most revealing about a revolution that was put into motion in the first decades of the 20th century. The discourse developed by the authors in their methods teaches us about instrumental practice in a given time period. Thus, in 1846, Kastner addresses himself to an adult audience, and uses refined language, while Cokken's imperious tone is a correlation to his instructional post at the *Gymnase musical militaire*. It would be the same with Parès in 1895, conductor of the *Garde Républicaine*.⁵¹ With Kastner, it is the invitation to discover and play an instrument; Cokken and Parès, on the other hand, were preoccupied with the imperatives of rapid and efficient training of military musicians who could also learn to respect hierarchy. Twenty years later, Klosé and Mayeur would distinguish themselves by the tone of their writing: the former used the third person singular in speaking to the student, as does Cokken, while Mayeur, as an author, used "I," which seems to put him in closer, more personal proximity with the student. Thiels⁵² would also have trouble finding a convivial tone in his method when advising students how to master the exercises. Similarly, Fontbonne,⁵³ in his preface, doesn't hesitate to allude to advice that he learned from his grandmother! The methods from the 1930s, such as that by Viard,⁵⁴ are written in a freer tone. While the teaching of "classical" saxophone seemed to be declining, the instrument was newly championed and supported by musicians like Laurent, Spéranza-Camusat, Decruck and Breilh, who didn't hesitate to draw repertoire from popular idioms such as dance-hall music and jazz. The authors took advantage of these new genres of music to bring more of a sense of fun to the learning of the instrument and introduce, under other melodic forms, playing techniques that were found in the methods of preceding periods. They modernized their approach: Guyot,⁵⁵ for example, discusses ornamentation in jazz, and Laurent discusses the use of new sonorities for the instrument: *fluster tongue* [*sic*], *sneeze* (imitation of a sneeze), *smear* (bell sound), *slap* (clicking).

Procedural knowledge, which is linked to the ways of playing the instrument, evolved via contact with popular music, just as declarative knowledge changed with the role and the place that the saxophone held in society. En route from the *Gymnase musical militaire* to dance halls, it acquired a reputation in the classical-music world, for composers in the years 1900-1940 discovered its different sonority,⁵⁶ and new performance practices combined with technological improvements to the instrument rendered it more attractive. The saxophone, which had not succeeded in finding a true place in symphony or opera orchestras, suffered from its image as a military or civil wind band instrument, but even more so because of a lack of good instrumentalists capable of championing it. Additionally, it is paradoxical that composers, who were interested in its sonority, didn't know the saxophone well. At the end of the First World War, when scrap metal was being sold by the kilo, saxophones -- worth more for their nickle-,

⁵¹ On language categories in the saxophone instructional methods, read the thesis of Jonathan Robert, "Les méthodes de saxophone de 1846 à 1942, genèse et évolution de l'enseignement du saxophone en France" (June 2010), Conservatoire national supérieur de musique et de danse de Paris.

⁵² Victor Thiels, *Méthode complète pour tous les saxophones* (Paris: Lemoine, 1903).

⁵³ Léon Fontbonne, *Méthode complète et pratique du saxophone soprano, alto, ténor et baryton*, (Paris: Costallat, 1908).

⁵⁴ Jules Viard, *Grande méthode de saxophone, Première partie* (Paris: Éditions Salabart, Collection E. Gaudet, 1935), 56.

⁵⁵ H. Guyot, *Méthode de saxophone simple et pratique* (Paris: J.-B. Fontana, 1930), 39.

⁵⁶ Following the practice of the members of the Groupe des Six, young composers listening to and played all the music of their time. Milhaud and Poulenc went to dance halls, and the spirit of Cocteau's *Le Coq et de l'Arlequin* left its mark.

silver-, or gold-plated brass alloy than as musical instruments -- were being sold to scrap merchants. It was just at this moment, when the saxophone was disappearing from the French musical landscape, that the Americans were bringing it back to life via the enthusiasm of Europeans -- and the French in particular -- for big band jazz. The saxophone's sonic color became a source of interest to up-and-coming composers like Milhaud, Ravel, and Honegger. The tone of the writing employed in the methods of this fourth period, 1920-1940, rendered the instrument more accessible, more "democratic." If the chapters in these new methods were still so similar that they could still be mistaken for those in the older publications, nonetheless, the prodigious advice offered by the authors invited saxophonists to listen to and imitate the timbres of other instruments, or informed readers of their personal choices, as did Viard.⁵⁷

III. The History of a Missed Revolution . . . and What Became Of It

The study of these methods and texts that form the history of the saxophone allow the construction of an initial epistemological framework of the instrument and the discoveries with which it was associated. Historically, it was presented as a revolution in the world of musical instrumentation; but our research reveals more of a major innovation in the sonic and acoustic universe than an instrumental revolution, such as later would be represented by the theremin or the Moog synthesizer.

Kuhn's theory of the disciplinary matrix can be applied to our reading of the history of the instrument, which starts with the writings of François-Joseph Fétis and the contents of the methods. Adolphe Sax's discovery rests on the sound and the elements that constituted it in the musical universe of his time — namely, intonation and timbre. In inventing his saxophone, Sax was responding to questions that had occupied the scientific world and the instrumental manufacturing industry for several decades. He created an instrument that could be played in tune, possessed an even and pleasant timbre, and was capable of the greatest dynamic range within a single phrase — qualities that had not seemed possible in single-reed instruments. The scientific objective was achieved, and at the same time, many of the organological difficulties were overcome. Sax inscribed his innovations into the history of instruments by duplicating the original model into a wide range of instruments, large and small, creating a whole instrumental family that allowed saxophonists to vastly expand their musical repertoire. The validity of this group of paradigms, new and old, was confirmed by the reports of great musical thinkers such as Savart, Fétis, Kastner, and Gevaert -- but also by the community of expert musicians: composers and instrumentalists. All the documentation of Sax's innovations was divulged in articles in specialized music journals, contemporary newspapers, dictionaries and other official reports, thus establishing an official history of the saxophone and its inventor. The scientific, academic and even political communities of the era recognized the paradigms upon which Sax's scientific discoveries were based and supported their superiority.

The sonic modernity of the saxophone did not have a parallel in its instruction, for the men who wrote the methods simply didn't understand the potential scope of this innovation, as Fétis wrote in his 1855 report. Indeed, it is highly probable that the inventor himself didn't grasp the full measure of his new instrument, busy as he was with quarrels with other instrument manufacturers, financial difficulties, the need for recognition and his involvement with the social and industrial spirit of his times. The sole method ever written by Sax responded to commercial solicitations for pedagogical methods for different instruments, which were common in the last decades of the 19th century.⁵⁸ Study of the methods published between 1846 and 1942 confirms that the response to Sax's instrumental innovation was academic

⁵⁷ Viard (1935).

⁵⁸ Adolphe Sax, *Méthode complète pour saxhorn et saxotromba, soprano, alto, ténor, baryton et contrebasse à 3 et 5 cylindres suivi d'exercices pour l'emploi du compensateur* (Paris: Brandus, 1851).

conservatism in matters of instruction. Saxophone pedagogy was copied from the pedagogies for clarinet and other wind instruments of the period. Sax's principal innovation, the sonority of the instrument, and its timbral potential, was approached neither formally nor fundamentally — or only very superficially. Numerous effects, like the long tones addressed in Klosé's 1843 method were directly inspired by clarinet performance practice. On the academic side, saxophonists would not stop fighting to be recognized as "real" instrumentalists and participate fully in major music ensembles. But they obtained their saxophone technique from instruments that already had a place in these ensembles, and too often were training musicians who had a perfect mastery of these other instruments (Cokken, Hartmann, Klosé, Mayeur, Viard, etc.).

How, in a social milieu as corporatist as that of instrumentalists, could a new instrument find its place? Certainly not by drawing from the academic penchants of its confreres. Historically, the creation of a complete family found precedent in the consorts or ensembles of instruments from the 16th and 17th centuries, but could not rival or evenly match the string quintet. Even Souale,⁵⁹ when he tried to emancipate the saxophone repertoire, wrote conventional music; the works of other composers (Combelle, Caplet) are marked by a conventional orientalism or exoticism. In society's eyes, the saxophone was the instrument of the military and the orpheons, and the training of the musician often left something to be desired. This is what led the instrument almost to practically disappear in the 1910s, even as its growth was rising on the other side of the Atlantic. One of the numerous paradoxes in the methods is the apparent loss of social status of the instrument, which had become popular at the beginning of the 20th century, and which would be the same source of its regeneration in the 1920s. Far from the academic conservatism of its beginnings, the jazz-age saxophonists dared emancipate both the repertoire and the performance practice through timbral experimentation and new performance modes. Jazz was already no stranger to these innovations, while the music coming from Brazil, popular music and different orchestrations enabled the rebirth of the instrument.

This renaissance was also marked by a search for legitimacy. Saxophonists did their own research on the instrument in the 1920s, and the organological innovations assured the longevity of the instrument. At the same time, virtuosos commissioned or were the dedicatees of important new works. Instrumental technique also evolved outside of the academy. The recognition would be total in 1942, when Delvincourt created a saxophone class, with Marcel Mule named as professor. This date confirmed the legitimacy of the instrument in France in terms of the right of musicians to receive high-quality instruction recognized by the whole of the milieu and the duty to be as exigent in pedagogical innovation as in musical creation.

Just as the early saxophone's sound inspired surprise and opened up new sonic horizons, a method should permit the student to reveal, be curious, play, and make music.

A revolution is for me a special sort of change involving a sort of reconstruction of group commitments. But it need not be a large change, nor need it seem revolutionary to those outside a single community.⁶⁰

In this history of saxophone methods between 1846 and 1942, the revolution did not take place on the level of instruction, as we were able to affirm after analysis of the methods. New approaches only began to materialize with the arrival of popular music and new improvisatory practices in the repertoire of the instrument. This leads to the conclusion that the "revolution" in France only got underway just at the moment when our investigation ended: in 1942.

⁵⁹ See the article by Antonino Mollica in this volume.

⁶⁰ Kuhn, *The Structure of Scientific Revolutions*, 180-1.

Conclusion

The innovative quality of the saxophone was not accompanied by pedagogical innovations, at least at the beginning. The authors of the methods thought to legitimize a field of musical research in writing their works, but they only legitimized themselves -- and there's nothing surprising about that. These authors drew upon their expertise and personal experiences to try to create tools that would allow musicians to master this new instrument. Methods varied according to different time periods, as is evident in this study. Their scholarly value, didactic and pedagogical, was also re-evaluated in every time period, and permitted the passage from one paradigm to another. But they also represented the contemporary theoretical, methodological and social beliefs, as well as the rules shared by the constituents of a community in a given period.

Our study allowed us to better understand the history of the saxophone and the paradoxes that it embodies. The saxophone methods published between 1846 and 1942 are testimonies to the social conduct of musicians, of "missed encounters" with the instrument and the history of music, and of paradoxes that tore apart musical instruction. This work is thus valuable for what it reveals methodologically and for the thinking that it might inspire among musician-teachers in every discipline.

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