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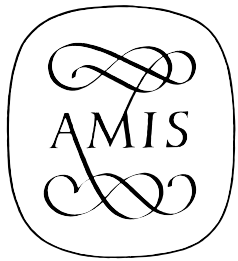

The Saxotromba: Fact or Fiction?

Eugenia Mitroulia

The saxotromba, patented by Adolphe Sax in 1845, has been one of the mysteries of the world of brasswinds. No extant instrument has so far been identified as a saxotromba,[1] and modern scholarly references to the saxotrombas are brief, many declaring that this family of brass instruments has ceased to exist. This article gives an overview of the development of the saxotromba family and attempts to cast some light on the problematic aspects of the subject.

The Early References to the Saxotromba and the Saxotromba Patent

The earliest references to the saxotromba date to 1844. According to an engraving published in the weekly newspaper *L'Illustration* in July of that year, a *sax tromba* appeared among the instruments exhibited by Sax at the 1844 Paris National Exhibition.[2] However, the instrument depicted does not share the features of the later saxotrombas; rather, it looks similar to the *contrebasses d'harmonie* of Sax's 1843 patent.[3]

The author is indebted to a number of people who have helped with this study. Arnold Myers (University of Edinburgh), the author's supervisor, provided assistance, guidance, and help with measurements. Darryl Martin, my second supervisor, provided assistance. Raymond Parks (University of Edinburgh) photographed relevant instruments in the Edinburgh University Collection of Historic Musical Instruments. Bruno Kampmann (Paris) provided access to his private instrument collection. Géry Dumoulin (Museum of Musical Instruments, Brussels), Thierry Maniguet (Musée de la musique, Paris), Bradley Strauchen (Horniman Museum, London), Sabine Klaus (National Music Museum, Vermillion, SD), and Andrew Lamb (Bate Collection, Oxford) provided access to relevant instruments and photographs.

1. For a list with information on extant instruments made by Sax, see Eugenia Mitroulia and Arnold Myers, List of Adolphe Sax Instruments, http://www.galpinsociety.org/gdsl.html. The author invites anyone aware of Adolphe Sax or Adolphe-Edouard Sax (fils) woodwind or brasswind instruments not included in this list to send additions to mitroulia.sax.instruments@gmail.com or webmaster@galpinsociety.org.

2. H. Robert Cohen, ed., *Les gravures musicales dans L'Illustration, 1843–1899* (Québec: Presses de l'Université Laval, 1982–83), 1/47 (July 4, 1844, p. 296).

3. These were contrabass brass instruments used in wind ensembles where brass instruments predominate. The *contrebasses d'harmonie* of Sax's 1843 patent look very similar to the *Bass-Tuben* of Wieprecht and Moritz. The author knows of no surviving instrument made by Sax that resembles these instruments. For an illustration, see Eugenia Mitroulia and Arnold Myers, "Adolphe Sax: Visionary or Plagiarist?" *Historic Brass Society Journal* 20 (2008): 94.

Jean-Georges Kastner's 1844 *Supplément*[4] to his *Traité général d'instrumentation* of 1837[5] mentions the *saxo-tromba* among the innovations in musical instrument making that had occurred since the original publication. Although the *Supplément* was published the year before the issue of Sax's saxotromba patent, Kastner devoted a section to the *saxo-tromba chromatique*,[6] an instrument he described as having a sound between a bugle and a trumpet. According to Kastner, there was a complete family of such instruments, from soprano in F and E-flat to contrabass in F and E-flat. In the same *Supplément,* a group of instruments that today would be called saxhorns appears under the name *bugles à pistons ou à cylindres (flügelhorns)*; the instruments are not called "saxhorns" even though there is evidence that this term was known at that time.[7] These instruments were developed by Sax in 1843 and have an intermediate bore-profile (between cylindrical and conical). They formed a complete family of instruments in various sizes and alternate pitches.

On the other hand, according to the testimony of a former workman of Sax's named Hubart,[8] it was in the following year, on Easter day 1845 [March 23], that the first saxotromba was made. Hubart stated that Sax had shown him a drawing of an instrument *à deux tours* (with two turns) that he had designed.[9] The workman testified that he had worked nonstop on the instrument until late at night. Both of them admitted that Sax needed the instrument the following day to submit to the commission for the reform of military bands, and Sax did not deny having had Hubart work during the night and in secrecy.[10] This commission, formed

4. Jean-Georges Kastner, *Supplément au Traité général d'instrumentation* (Paris, 1844).

5. Kastner, *Traité général d'instrumentation, comprenant les propriétés et l'usage de chaque instrument, précédé d'un résumé sur les voix, à l'usage des jeunes compositeurs* (Paris, 1837).

6. Kastner, *Supplément*, 37–38.

7. See, for example, a letter from Hector Berlioz to Adolphe Sax written toward the end of 1843, where the term "saxhorn" is used by Berlioz. Hector Berlioz, *New Letters of Berlioz, 1830–1868* (*Nouvelles lettres de Berlioz, 1830–1868*) (New York: Columbia University Press, 1954), 50.

8. Hubart was an instrument maker working at Passage Chausson, 5, Paris. He was described by Sax's lawyer as a small manufacturer, one of the makers who forged Sax's instruments. He worked for Sax during 1844–48 and 1851–55. See *Affaire Sax: Pièces justificatives contenant: 1° Les enquêtes et contre-enquête des 30 Juillet et 13 août 1858; 2° La contre-enquête du 27 Mars 1856* [*sic*]; *3° Les déclarations, attestations, lettres, certificats et autres documents venant s'ajouter aux enquêtes* (Paris: N. Chaix, 1860), 13.

9. *Défense de M. Besson contre M. Sax: Enquête, contre-enquête et jugement avant faire droit rendu par le tribunal le 13 août 1858* (Paris: H. S. Dodney-Dupré, 1858), 65.

10. Ibid.

in 1845, had invited Parisian instrument makers to submit instruments for possible use in the reorganized military bands. On April 22, Sax's band competed against that of Michele Carafa, director of the Gymnase de musique militaire, on the Champ de Mars in Paris. Sax's band, which consisted of instruments of his own manufacture, was declared the winner, and it was decided that Sax's instruments would be used in the military bands, thus giving him a monopoly. This decision was not well received by the majority of instrument makers of Paris, and from that point on they pursued Sax through the courts, with accusations that his instruments lacked originality.[11]

The 1845 Saxotromba Patent[12]

In October 1845, Sax applied for a fifteen-year patent for the saxotromba, whose form, with small modifications, could be applied to saxhorns, cornets, trumpets, and trombones.[13] The patent specifications included:

1. The invention of the saxotromba, as an instrument and as a form. As instruments intended for use by musicians of the cavalry, saxotrombas were to be made in an upright form, designed to be held between the player's left arm and left side and with the bell slightly tilted from left to right, so that the player could not be hit by the horse's head nor the horse by the instrument's bell. A special feature of the form, not explicitly mentioned in the patent but appearing several times in subsequent sources, is the placing of the valves "parallel to the bell."[14] See, for example, figure 2b: a line linking the valve buttons (b) would be parallel to the plane on which the bell rim lies (a).

11. For more detailed discussion of the various lawsuits between Sax and the Parisian makers, see Malou Haine, *Adolphe Sax (1814–1894): Sa vie, son œuvre et ses instruments de musique* (Brussels: Editions de l'Université de Bruxelles, 1980), 163–71.

12. For a complete list of Adolphe Sax's patents for brass instruments, see Mitroulia and Myers, "Adolphe Sax: Visionary or Plagiarist?" 136–37.

13. Adolphe Sax, Pour un instrument de musique dit Saxotromba, dont la construction, au moyen de légères modifications, peut être appliquée aux Sax-horns, cornets, trompettes et trombones, French patent no. 2306, filed October 13, 1845, and issued November 22, 1845. According to French patent law of the time, after patents were issued they were valid from the application date.

14. See for example, Mahler, ed., *Tribunal de la Seine. 6^e^ chambre correctionnelle . . . Adolphe Sax, demandeur en condamnation pour contrefaçon contre les sieurs Besson, Raoux, Halary . . . et autres . . . Audience du 23 février 1860. Réquisitoire de M. Mahler* (Paris: N. Chaix, 1860), 9.

2. The application of the saxotromba form to saxhorns, trumpets, cornets, and trombones.

3. Modifications to the valves. All instruments of the new system could be fitted with crooks and shanks to change the pitch, something that was not possible with all the instruments of Sax's 1843 patent. A fourth valve was added to the instruments that needed an extension of their range in the lower register.

The patent application includes a page of drawings of the instruments (fig. 1). Only two of the instruments in the drawings are saxotrombas: an alto[15] in 6½′ E-flat and a baritone in 9′ B-flat. Three other instruments normally made in bell-front form are depicted here in saxotromba form: a cornet, a trumpet, and a trombone.[16] The rest of the instruments are described and depicted as saxhorns in various pitches.[17]

A unique aspect of this patent is that Sax provided some measurements of bore width at various points. However, the measurement points were not precisely identified. Although he specified that saxhorns were wider than saxotrombas, Sax never revealed the exact proportions of his instruments, and this triggered complaints among his competitors. For the alto saxotromba in E-flat, seven measurements are given, and for the baritone saxotromba there are six. For the alto saxhorn, seven measurements are given. No baritone saxhorn is included in the patent. Sax provides no measurements for the cornet, trumpet, and trombone in saxotromba form, since (as he stated) the proportions of these instruments were already known to the general public. He altered only the form of these instruments, and not their proportions—an approach confirmed by the surviving instruments. During the court hearings for the lawsuit concerning the originality of these instruments, the experts observed that the exact points where the diameters were placed by Sax were not identified, and could only be established by the scale of the drawings.[18] However, the copies of the patent currently available from the Institut national de la propriété industrielle in Paris are lacking the scale.

15. The terms alto and tenor were used interchangeably by Sax over the years to denominate the instrument in 6′ F or 6½′ E-flat. In this article, the author has chosen to use the term alto, which appeared more often in sources of the time.

16. In the patent, the cornet appears as figure 14, the trumpet as figure 16, and the trombone as figure 17.

17. Figures 5, 5+, 6, 7, 8, 9, 10, 11, and 12 of the patent.

18. Surville, *Rapport de M. l'expert Surville Ingénieur: Déposé le 18 février 1859 et dire de M. Sax* (Paris: Imprimerie Centrale des Chemins de Fer de Napoléon Chaix et Cie, 1860), 27.

An additional problematic aspect of the measurements is that Sax does not state clearly in the patent whether the diameters are external or internal. But clarification appears in the *Rapport de M. L'expert Surville* (1860). This report, compiled by Surville, an engineer appointed by the court, concerns 1) the originality of Sax's 1845 patent and his saxotromba, and 2) whether a number of major Parisian makers had produced counterfeits of the saxotromba. The outcome was favorable to Sax. In the report, Sax's 1845 patent drawings are compared with instruments made by Sax and other makers:

> These instruments were divided according to their length, and as indicated by the drawing accompanying the patent, so as to point out the diameters corresponding to those mentioned in the patent and allow comparison between them. The measurements thus were taken from the exterior of the tube; it was completely impossible to take these diameters directly in the interior. The comparison with the diameters indicated in the patent had to be done in this way, since these indications are those of the external diameters. The difference between these diameters and the interior diameters mentioned in the judgment of August 13, 1858, appeared unimportant, since it would only be the double thickness of the metal sheet employed in the manufacture of the instruments, a sheet that is the same for all [instruments] and that is not more than half a millimeter thick.[19]

Thus, the diameters given in the patent are considered by the author to be external.

Evidence from the Measurements

Issues of terminology. Some unclear issues concerning the alto saxhorn must be considered before discussing the measurements in more detail. Sax does not use the term "alto saxhorn" in the patent specifications. For figure 5 of the patent drawings he uses the term "saxhorn," without

19. Surville, *Rapport,* 9: "Ces instruments ont été divisés selon leur longueur, d'après la division indiquée au dessin joint au brevet, pour relever les diamètres correspondant à ceux portés dans le brevet et les comparer entre eux. Les dimensions ainsi prises ont été relevées à l'extérieur du tube; il eût été tout à fait impossible de prendre directement ces dimensions à l'intérieur. La comparaison avec les diamètres indiqués au brevet devait se faire ainsi, puisque ces indications sont celles des diamètres extérieurs. La différence entre ces diamètres et les diamètres dont parle le jugement du 13 août 1858 a paru insignifiante, puisqu'elle ne serait que de la double épaisseur de la feuille métallique employée à la fabrication des instruments, feuille qui est la même pour tous et qui n'a pas plus d'un millimètre d'épaisseur."

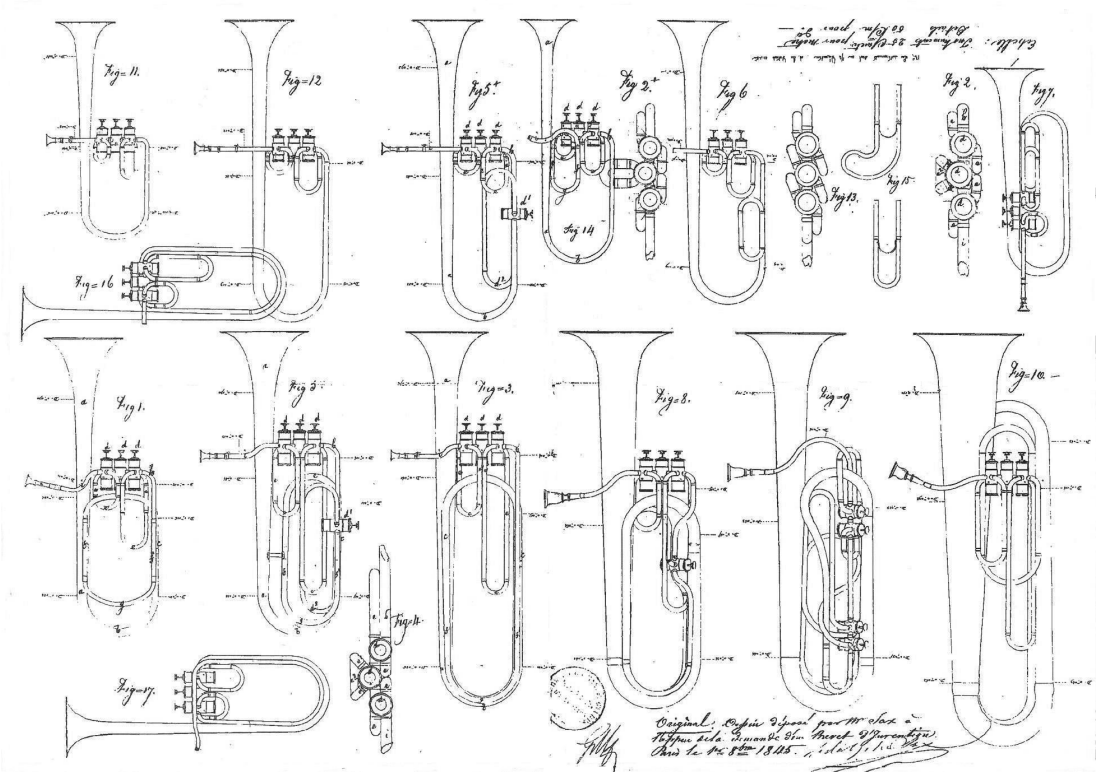

FIGURE 1. Adolphe Sax, Pour un instrument de musique dit Saxotromba, dont la construction, au moyen de légères modifications, peut être appliquée aux Sax-horns, cornets, trompettes et trombones, French patent no. 2306, filed October 13, 1845, drawings.

Instruments shown in figure 1.

From top left:
Figs. 11 and 12. Saxhorns
Fig 16. Trumpet in saxotromba form
Fig. 5+. Saxhorn with four valves
Fig. 14. Cornet in saxotromba form
Fig. 2+. Detail of valve section of fig. 1 (saxotromba in E-flat), with the slide for the semitone in a different configuration from fig. 2
Fig. 6. Saxhorn
Fig. 13. Detail of valves for figs. 3 (saxotromba in B-flat), 8, 9, and 10 (saxhorns)
Fig. 15. Crooks
Fig 2. Detail of valve section of fig. 1 (saxotromba in E-flat)
Fig. 7. Saxhorn in A-flat made according to the specifications of the 1843 patent
Fig. 1. Saxotromba in E-flat
Fig. 5. Saxhorn with four valves
Fig. 3. Saxotromba in B-flat
Figs. 8, 9, and 10. Saxhorns
Fig. 17. Trombone in saxotromba form
Fig. 4. Detail of valves for fig. 3 (saxotromba in B-flat).

In numerical order:
Fig. 1. Saxotromba in E-flat
Fig. 2. Detail of valve section of fig. 1
Fig. 2+. Detail of valve section of fig. 1, with the slide for the semitone in a different configuration
Fig. 3. Saxotromba in B-flat
Fig. 4. Detail of valves for fig. 3
Figs. 5, 5+. saxhorns with four valves
Figs. 6, 8, 9, 10, 11, 12. Saxhorns
Fig. 7. Saxhorn in A-flat made according to the specifications of the 1843 patent
Fig. 13. Detail of valves for figs. 3 (saxotromba in B-flat), 8, 9, and 10 (saxhorns)
Fig. 14. Cornet in saxotromba form
Fig. 15. Crooks
Fig. 16. Trumpet in saxotromba form
Fig. 17. Trombone in saxotromba form

defining the pitch or exact instrument type, and it is assumed that this is an alto instrument due to the drawing's size, which is comparable to the adjacent drawing of the saxotromba in 6½′ E-flat (figure 1 of the patent drawings).

Table 1 shows the proportions of the two alto instruments (saxhorn and saxotromba) as given in the patent. The differences between the two are noticeable, and Sax repeatedly stated that the distinction between the saxotromba and the saxhorn was the narrower bore of the former.[20] It is not clear, though, whether these are the usual proportions for an alto saxhorn or if they are peculiar to the four-valve type shown here. Sax notes in the patent for this particular saxhorn that it is a "saxhorn with four valves [and] great width, for [playing] the second part. This instrument has a volume of sound that is larger [and] fuller . . . it descends as low as the lips allow."[21]

If bore size were the only criterion for differentiating between a saxhorn and a saxotromba, then the patent itself is inconsistent: the contralto saxhorn is represented among the drawings by two different models—a three-valve, narrow-bore instrument and a four-valve, wide-bore instrument made after the same system as the four-valve alto saxhorn.[22] Would not this mean that the narrow-bore contralto should be called a saxotromba? In fact, it is not. Therefore, there must be additional criteria for designating an instrument as a saxotromba. As regards the baritone saxotromba, it can be observed that in the 8–9′ register Sax created two instruments: the narrow-bore baritone saxotromba and the four-valve, wide-bore bass saxhorn. No baritone saxhorn appears among the patent drawings.

Method. The author has developed a method for the effective use of the measurements given in the patent drawings. The drawings of the saxotrombas were enlarged and measured with a tape measure in a way similar to that by which actual instruments are measured. The points where

20. For example, in the 1845 saxotromba patent (French patent no. 2306): "Les saxhorns ont des proportions plus larges que le saxo-tromba" and "Sax-horn contrebasse en mi bémol. Il est, comme nous l'avons déjà dit, plus fort et plus gros de tube que le saxotromba du même ton." See n. 13 above.

21. Sax, French patent no. 2306: "Sax-horn à quatre cylindres grande largeur, pour seconde partie. Cet instrument a un volume de son plus considérable, plus gros, si je puis m'exprimer ainsi: il descend aussi bas que les lèvres le permettent."

22. The analogy between the four-valve tenor and the four-valve contralto is also shown by similar numbering of their figures in the patent drawing (5 and 5+ respectively).

TABLE 1. Diameters of the alto saxhorn and alto saxotromba as given by Sax in his 1845 patent. The location of the measurement points has been calculated by the author.

Alto saxotromba		**Alto saxhorn**	
Location of measurement point (percentage of total tube length)	Diameter in mm	Location of measurement point (percentage of total tube length)	Diameter in mm
0.44%	11	1.36%	13
13%	12	13%	14
51%	16	53%	21
59%	20	61%	27
71%	24	73%	32
82%	34	85%	44
93%	70	94%	70

Sax's given diameters were located were then calculated in percentage of total tube length. The measurements were then compared with measurements of existing instruments and those of saxotrombas whose measurements were discussed during the lawsuits. The bore diameter of surviving instruments was measured at points as close as possible to those used by Sax in his patent and re-created here. The mouthpiece length was not taken into consideration in calculating the total instrument length from the drawings. It is possible that Sax included the mouthpiece length, but since we have almost no evidence at all about the mouthpieces used, it was considered safer here to omit that length than to guess at what it might be. This omission should not affect the reliability of the measurements or the degree of error, since the same method was consistently followed for measuring all drawings and all surviving instruments. Additionally, it should be mentioned that the bore widths of actual instruments used for the comparison are the external ones.

Alto instruments. The measurements of the alto saxotromba and the alto saxhorn derived from the patent drawings are compared in table 2 with those of six surviving instruments and two instruments presented in court (surviving instruments are depicted in figures 2 and 3). Sax was involved in many lawsuits against rival manufacturers during his lifetime, lawsuits that led him into bankruptcy three times. The lawsuit minutes

TABLE 2. Comparison of dimensions of instruments included in the patent, alto saxotrombas presented in court, and surviving alto instruments made by Sax. All dimensions are given in mm.

Abbreviations:
BK Bruno Kampmann, private collection, Paris
EU Edinburgh University Collection of Historic Musical Instruments, Edinburgh
MM Musée de la musique, Paris

Saxotromba (1845 patent)	**Saxhorn (1845 patent)**	**Saxotromba presented in court (1857–58)***	**Saxotromba presented in court (1857–58)**	**Alto EU 4620 (1854)**	**Alto EU 4543 (1855)**	**Alto MM E.1693 (1858)**	**Alto BK 9 (1862)**	**Alto MM E.1869 (1871)**	**Alto BK 349 (1880)**
11	13	11	11.5	11.5	11.9	11.7	12	11.2	10.9
12	14	12	12	12.6	13.1	12.3	12	12.4	12.2
16	21	16	17	14.5	16.5	15.6	16.7	14	15.5
20	27	18.5	29	18.1	21.5	17.8	18.6	17.1	19.5
24	32	23.5	25.5	23.3	22.9	22.7	25.2	21.4	24.9
34	44	33	33.5	31.3	32.6	32	38.1	31.8	34.9
70	70	60	60.5	54.6	53.1	53.8	81.7	54.5	62.1

*The dates of manufacture for the two saxotrombas presented in court derive from their serial numbers, which are listed in Surville, *Rapport de M. l'expert Surville Ingénieur: Déposé le 18 février 1859 et dire de M. Sax* (Paris: Imprimerie Centrale des Chemins de Fer de Napoléon Chaix et Cie, 1860). The serial numbers 16214 and 17312 place the two instruments in 1857 and 1858. Surville does not specify which measurements belong with which instrument.

FIGURE 2a. Alto saxotromba in 6½′ E-flat, Adolphe Sax, Paris, 1855. Edinburgh University Collection of Historic Musical Instruments (inventory number 4543); photograph by Raymond Parks.

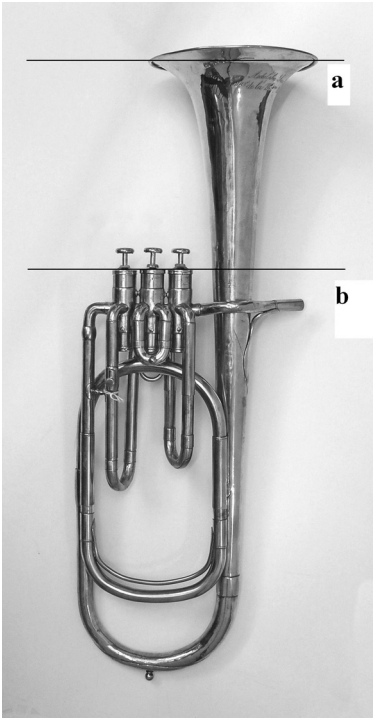

FIGURE 2b. Saxotromba with the valves "parallel to the bell." The imaginary line linking the valve buttons (b) is parallel to the plane where the bell rim lies (a).

often contain invaluable information regarding Sax's instruments. As well, the *Rapport de M. l'expert Surville* mentioned above contains measurements of two alto saxotrombas made by Sax (serial numbers 16214 and 17312).[23] To help Surville draw some conclusions on the originality of Sax's 1845 patent (the patent was contested by Sax's rivals, among which were Besson, Gautrot, Raoux, Buffet jeune, Halary, and Gambaro), instruments made by Sax at this time were compared with the two saxotrombas in the 1845 patent drawings and also with instruments at the same pitch made by other makers after the 1845 patent was issued.

23. Surville, *Rapport*, 21–23.

FIGURE 3. Alto saxotromba in 6½′ E-flat, Adolphe Sax, Paris, 1854. The instrument resembles in shape the saxotromba in F, E, and E-flat in Sax's sales catalogs, where the additional loop between the mouthpiece and the valve section is normally absent. Edinburgh University Collection of Historic Musical Instruments (inventory number 4620); photograph by Raymond Parks.

The present author has used the measurements of Surville's report in her own further comparisons.

These further comparisons reveal that the measurements of surviving alto-size instruments made by Sax that have up to now been considered saxhorns, match the measurements of the saxotrombas of the patent drawings very closely; the alto saxhorn in the drawings appears to have a wider bore, and its measurements do not correspond with those of surviving instruments thought to be alto saxhorns. No surviving example of a wide-bore alto saxhorn is known to the author.

This, in the author's view, proves that alto saxotrombas have not actually ceased to exist. It appears that either the alto saxotrombas were merged with the saxhorn family and supplanted the alto saxhorns—if there was ever a clear distinction between the two—or that saxhorns as envisaged by Sax and presented in the patent were never produced commercially. Thus, surviving instruments made at the Sax workshop and previously thought to be alto saxhorns should be identified as alto saxotrombas. It appears that the alto saxotromba was nothing more than the narrow-bore alto instrument, with no further features distinguishing it from the saxhorn.

The measurements of the narrow-bore alto instruments seem to be consistent in the first two-thirds of their total tube length, but the surviving instruments and those presented in court deviate in the last third. Sax was aware that such deviation was a possibility, pointing out that the last part of the tube's expansion does not significantly affect the instrument's quality of sound.[24] This portion of the instrument, according to Sax, could be modified according to the taste of the customer without any disadvantages. Deviations in the first two-thirds of the instrument are more critical, he said; however, small variations might occur and these are attributable to the difficulties of manufacture.[25]

The location of the third point of given diameter in the patent (as shown in table 1) is very close to the midpoint of total tube length, and this permits the use of the midpoint diameter as a criterion for the classification of an instrument as a saxotromba or a saxhorn. In table 3, surviving alto instruments made by Sax in 6′ F or 6½′ E-flat are compared with the alto saxotromba and alto saxhorn of the 1845 patent, according to their diameters at midpoint length. All the instruments examined are much narrower in diameter at midpoint length than the alto saxhorn of the patent. Therefore, the author argues that the present-day tenor horn of the British brass band is the direct offspring of the alto saxotromba and not of the alto saxhorn.[26]

24. Surville, *Rapport*, 50–51: "la voix propre de l'instrument . . . résulte plus particulièrement des proportions du tube dans ses deux premiers tiers à partir de l'embouchure. . . ."

25. Ibid.

26. See *Grove Music Online*, s.v. "Tenor Horn" (by Anthony C. Baines and Trevor Herbert), http://www.oxfordmusiconline.com (accessed September 1, 2009).

TABLE 3. Comparison of alto instruments according to diameter at the midpoint of total length.

Abbreviations:
BK Bruno Kampmann, private collection, Paris
EU Edinburgh University Collection of Historic Musical Instruments, Edinburgh
LHC Carse collection, Horniman Museum, London
MIM Museum of Musical Instruments, Brussels
MM Musée de la musique, Paris
NMM National Music Museum, Vermillion, SD

Location	**Name**	**Pitch**	**Date**	**Diameter at midpoint of length in mm**
1845 patent	Alto saxotromba	6½′ E-flat		16.00
1845 patent	Alto saxhorn	6½′ E-flat		21.00
Private coll, France	Alto saxhorn	6½′ E-flat	1844	13.90
NMM 7166	Alto saxhorn	6½′ F	1848	16.30
LHC 91	Alto saxhorn	6½′ E-flat	ca. 1850	15.70
EU 4620	Alto saxhorn	6½′ E-flat	1854	14.40
EU 4543	Alto saxhorn	6½′ E-flat	1855	15.20
MM E.1693	Alto saxhorn	6½′ E-flat	1858	14.70
BK 9	Tenor saxhorn	6½′ E-flat	1862	15.60
MIM 2469	Alto saxhorn	6½′ E-flat	1863	15.30
Private coll, France	Alto saxhorn	6½′ E-flat	1865	15.00
MM E.1696	Alto saxhorn, with postulated slide for F	6½′ F	1869	15.50
MM E.1696	Tenor saxhorn, slide for E♭	6½′ E-flat	1869	14.00
BK 349	Tenor saxhorn	6½′ F	1880	14.40

Baritone instruments. A major problem with instruments of the baritone group is the small number of surviving specimens from the early period. Only the baritone saxotromba appeared in the 1845 patent (figure 3 of the patent drawings; see fig. 1 above); no baritone saxhorn was included. Table 4 shows the diameters of the baritone saxotromba from the patent, along with the measurement points as calculated by the author.

Table 5 compares the patent measurements with those of surviving instruments. A first observation is that, with the exception of the *nouveau*

TABLE 4. Proportions of baritone saxotromba from Sax's 1845 patent.

Location of measurement points, in percentage of total tube length	9%	54%	66%	74%	89%	96%
Diameter in mm	14	17	20	26	40	74

TABLE 5. Comparison of measurements of surviving instruments and of the baritone saxotromba from the 1845 patent. Measurements are given in mm.

Abbreviations:
BK Bruno Kampmann, private collection, Paris
MM Musée de la musique, Paris
OB Bate Collection, Oxford

Saxotromba (1845 patent)	**Baritone saxotromba presented in court in 1858**	**Baritone MM E.0803 (1866)**	**Baritone OB 662 (1867)**	**Baritone BK 756 (1866)**	**Baritone MM E.1695 (1869)**	**Baritone BK 721 (1885)**
14	14	14.4	12.5	14.2	13.4	13.2
17	17	26.7	17.5	19.8	18.4	19.4
20	21	32.6	21.4	21.8	21.1	22.3
26	27	35.4	25.1	26.8	27	27.4
40	45	59.2	26.1	31.7	46.5	47.4
74	80	99	76	78	74	77.8

instrument—Sax's instrument with six independent valves, so named by himself—the measurements of surviving instruments are close to those of the patent, at least for the first four points.[27] As with instruments of the alto group, there is a great divergence at the distal end of the tube. The *nouveau* instrument in the Musée de la musique, Paris (inventory number E.0803), is much wider than the other three instruments, its bore profile approaching that of bass saxhorns.

A few issues arise in the interpretation of the above comparisons. First, two of the baritone instruments that show proportions similar to the baritone saxotromba were stamped "baryton saxhorn" by Sax

27. For more information on Sax's system of six independent valves, see Mitroulia and Myers, "Adolphe Sax: Visionary or Plagiarist?" 123–28.

(Bate Collection, Oxford, no. 662; Bruno Kampmann collection, Paris, no. 756). Moreover, in the military decree of March 26, 1860, in which Sax's instruments were declared suitable for use in cavalry and infantry bands,[28] some bore widths were provided for instruments of the saxhorn/saxotromba group. Here there are only three measurement points; the first is located very close to the mouthpiece receiver, the second and third in the distal half of the instruments' tubing, near the bell. Regarding the baritone instrument, the same drawing with the same measurements appears in both the section on cavalry bands and the section on infantry bands; in the former it is labelled as a baritone saxotromba and in the latter as a baritone saxhorn. This could have been a mistake by the copyist or just another indication that there was never any actual difference in bore profile between the instrument Sax called a baritone saxotromba in his patent and the instrument that later became known as the baritone saxhorn. It is possible that since baritone saxhorns were not included in the patent, the baritone saxotromba took the baritone saxhorn's empty place in the saxhorn family.

Conclusions. The evidence suggests that the alto and baritone saxotromba were the narrow-bore counterparts of the alto and bass saxhorn respectively. The evidence of the measurements shows that surviving instruments in the alto and baritone ranges can be identified as the alto and baritone saxotrombas of the 1845 patent. The term "baritone saxotromba" appears noticeably less often than "alto saxotromba" in documents of the time produced by Sax and other instrument makers, in instrumental tutors, and in the writings of composers and others. This might indicate that the term "baritone saxhorn" replaced "baritone saxotromba" very early as a designation for the baritone instrument of the saxhorn family, and that the term "alto saxotromba," which appears often into the late nineteenth century, was used much longer to designate the alto instrument of the saxhorn group.

28. See "Note ministérielle qui détermine les modèles types et les dimensions des instruments adoptés pour les musiques militaires, ainsi que-les pros et la durée de ces instruments," extract from the *Journal militaire officiel* 27 (1er semestre 1861). Copy at the Bibliothèque Nationale de France, site Richelieu-Louvois, Paris. For a reproduction of the drawings accompanying the decree, see Jacques Cools, "Adolphe Sax, la réorganisation des Musiques militaires sous Napoléon III," *Larigot,* no. 25 (March 2000): 31–35.

Instrument Inscriptions

The author's research reveals that Sax stamped the exact model type on his saxhorns between ca. 1864 and ca. 1870. The term "saxotromba" is not stamped on any surviving alto or baritone instrument, not even those with proportions corresponding to the alto or baritone saxotromba of the 1845 patent. Most of the alto instruments whose type is indicated are *nouveau* saxhorns, inscribed "nouveau saxhorn alto en Mi♭" on the bell. Later in the century, Sax preferred the term saxhorn—not saxotromba—for his alto instruments equipped with six independent-system valves, but only a single known instrument is stamped "saxhorn alto en mi♭". This instrument has not yet been the subject of detailed investigation.[29] There is too little information on its valve type and the exact shape of its body to be able to determine if its proportions differ from those of the rest of the surviving altos. No other alto instrument with regular (as opposed to independent) valves survives from the period 1864–70. All surviving baritone instruments from the period 1864–70 are stamped either "baryton saxhorn" or "nouveau baryton saxhorn"—even instruments that according to their proportions can be identified as baritone saxotrombas. Since all these instruments were stamped as "saxhorns," inscriptions cannot be used to differentiate between saxhorns and saxotrombas.

Instrument Shape

The shape of the instrument's body is probably another distinguishing feature of the saxotromba, at least for the early period. The characteristic shape with the two turns is observed in both the alto and baritone saxotrombas of the patent drawings. It therefore appears that an instrument from this early stage could be described as a saxotromba if it has both a narrow bore and the characteristic shape. The only known illustration of the complete saxotromba family appears in Kastner's *Manuel général de musique militaire* of 1848 (fig. 4).[30] The plate depicts alto and baritone instruments similar to those of the 1845 patent (models 3 and 6

29. The instrument is part of a private collection in Switzerland and was not available for examination due to the recent death of the owner.

30. Kastner, *Manuel général de musique militaire à l'usage des armées françaises* (Paris: F. Didot frères, 1848), plate XXI.

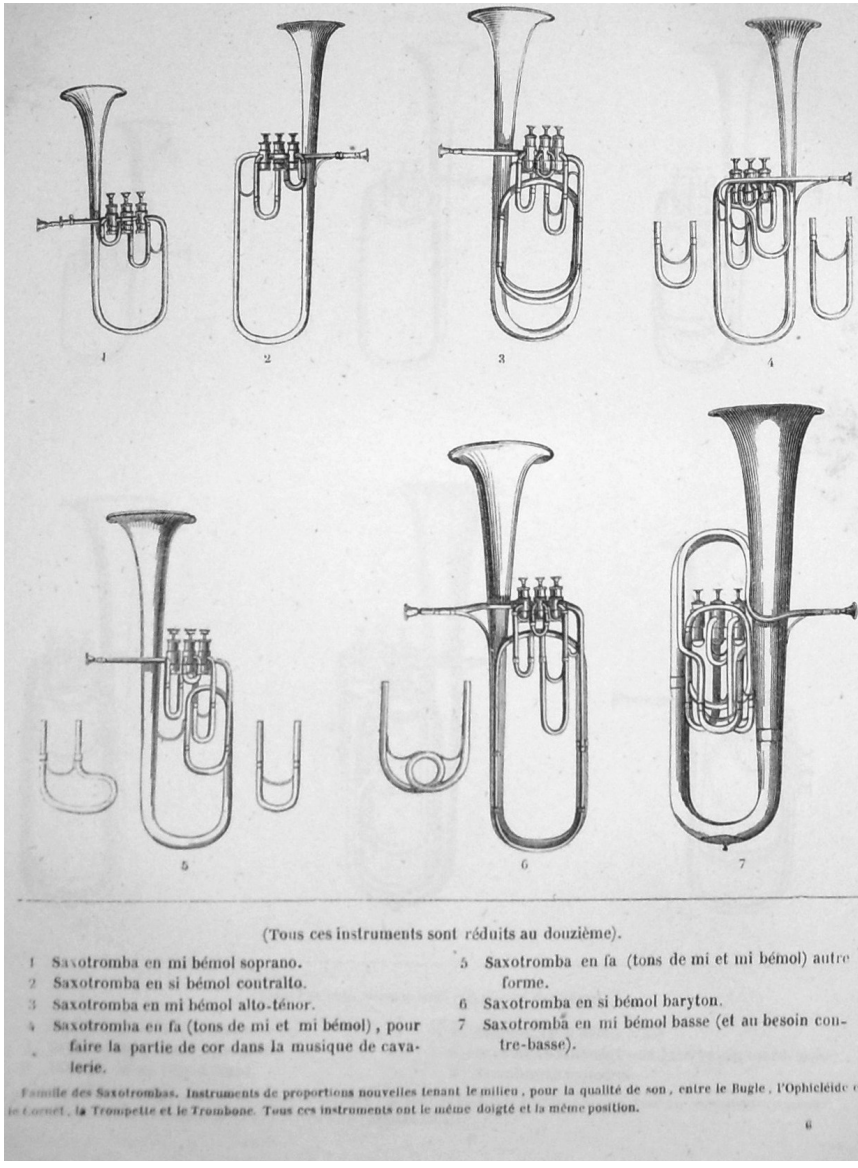

FIGURE 4. Jean-Georges Kastner, *Manuel général de musique militaire à l'usage des armées françaises* (Paris: F. Didot frères, 1848), plate XXI. A family of saxotrombas is depicted, although evidence suggests that only instruments of the alto and baritone size were made. The alto instrument is here represented by three models; model 3, with the characteristic shape "à deux tours," is the most common among surviving instruments.

of Kastner's illustration, figures 1 and 3 of the patent drawings); the rest of the supposed family members look identical to instruments known today as saxhorns. There are additional instruments in the alto register: two "saxotrombas" in F with crooks for E and E-flat (models 4 and 5 of fig. 4). These instruments, without the characteristic shape *à deux tours*, were intended to replace the horn in military bands; they also appear in a handbill from the Sax workshop published in 1850.[31]

Most surviving alto instruments have the characteristic saxotromba shape of the patent, with the two turns (see fig. 2); a few are shaped like the later saxotromba in F (with crooks for E and E-flat) appearing in Kastner's *Manuel général* and Sax's sales catalogs (see fig. 3). Some of the surviving baritone instruments are made in the characteristic shape *à deux tours*, although in general instruments of this register show a greater variation in shape than the altos.

Evidence from Other Sources

The ministerial decrees. A few points should be made regarding the nomenclature in the ministerial decrees. According to the 1845 decree on the composition of cavalry bands, both alto saxhorns and alto saxotrombas were to be included.[32] The February Revolution of 1848 and the resulting political changes in France left War Minister Rumigny (one of Sax's supporters) out of power. As a result, a new ministerial decree of March 21 in that year dropped the "sax" prefix from the terminology of instruments intended for French military bands, adopting instead the general term *clairon chromatique* for all members of the saxhorn/saxotromba family.[33] Thus the nomenclature no longer favored Sax, or any other maker in particular. This change was instigated by Sax's opponent Michele Carafa, who had connections to the republican government.[34] However, a new decree of 1854 reintroduced the term "alto

31. For a reproduction, see Haine, *Adolphe Sax*, 131.

32. For more on the ministerial decisions regarding the instruments used in French military bands, see Haine, *Adolphe Sax*, 98–115.

33. *Adolphe Sax demandeur en condamnation pour contrefaçon contre les sieurs Besson, Raoux, Halary, Buffet jeune, Buffet-Crampon, Tournier et Goumas, Martin frères, Beauboeuf, Victor Jacob, et autres. Audiences des 30 juillet et 13 août 1858, 5 août, 13, 22 et 29 décembre 1859, 5, 12, 19, 26 janvier, 2, 9 et 16 février 1860. Enquête, contre-enquête et plaidoiries. Audiences du 23 février 1860: réquisitoire de M. Mahler* (Paris: Imprimerie Centrale des Chemins de Fer de Napoléon Chaix et Cie, 1860), 69.

34. Haine, *Adolphe Sax*, 106.

saxotromba" for both infantry and cavalry bands. Among the baritone instruments, saxhorns are assigned to the infantry and saxotrombas to the cavalry. The picture is the same in the decree of 1860. In 1867, cavalry bands were abolished as an unnecessary expense.

Nineteenth-century instrumental tutors and music for brass in France. A great number of French instrumental tutors and many compositions for brass ensemble survive, especially from the second half of nineteenth century. The former offer written and iconographical evidence, and the latter offer invaluable information on nomenclature. A large collection of music for wind or brass bands is found in the Department of Music of the Bibliothèque Nationale de France, Paris. Many methods are written for the complete family of saxhorns; others are written for smaller groups or individual instruments. Terminology varies with the date of publication, and most composers and authors of instrumental tutors tried to comply with the official nomenclature established by ministerial decrees. The same can be said for the various sales catalogs.

An example of an instrumental tutor whose author complies with the official nomenclature is Schiltz's *Méthodes de clairons chromatiques ou Sax-horns à pistons ou à cylindres* (Paris: Paul Dupont, 1852).[35] The addition of the alternative "ou Sax-horns" was probably intended to alleviate any confusion created by discrepancies between the terminology used by the military officials and that used in scores and tutors. The term "saxhorn" had been used by instrument makers, composers, and performers for some years, but the term "clairons chromatiques" had been put into effect by the military officials only in 1848, by which time the term "saxhorn" was already in wide use in France and Britain.

A note in the 1850 sales catalog of Gautrot aîné et Cie explains that all saxhorns or saxhorn-type instruments are called *clairons chromatiques* because both flügelhorns and saxhorns are called by this general name in the Gymnase de musique militaire and in the various regiments of the army.[36] It is possible that the editors felt that they had to add that clarification since the term "clairon chromatique" was not widely used by musicians, composers or makers.

35. Schiltz, whose first name is unknown, appears to have been the author of many tutors, mostly for brass instruments.

36. *Manufacture générale d'instruments de musique Gautrot Ainé & Cie: Album et catalogue* (Paris: Plista, 1850), 10.

The information drawn from the instrumental tutors on the identity of the saxotromba is confusing. In some cases, the saxotromba is considered to be merely the bell-up version of the alto saxhorn, without considering Sax's statement that the bore profile of the saxotromba was narrower than that of the saxhorn. An example is Joseph Forestier's *Méthode complète pour les saxhorns ou bugles en mi♭ aigu, soprano, en si♭, contralto, en mi♭ grave alto ou ténor, ou saxtromba ou trombone alto à 3 cylindres* (Paris, 1846). Describing the instruments' form, Forestier writes that the saxhorn is shaped like the *bugle ou clairon de voltigeurs et chasseurs d'Orléans* (namely in trumpet shape, with the bell pointing to the front), a form particularly convenient for musicians of the infantry.[37] This form is not very suitable for musicians of the cavalry, he notes, due to the bell extending near the head of the horse; to avoid accidents, a bell-up instrument, called the saxotromba, has been designed. It is further explained that the term saxotromba could be dispensed with and the term "saxhorn à pavillon en l'air" used instead. In Forestier's later method for the instruments with independent valves, *Monographie des instruments à six pistons et tubes indépendants* (Paris: Adolphe Sax, 1867), there is no mention of the saxotromba. Sax himself published a *Méthode complète pour saxhorn et saxotromba, soprano, alto, ténor, baryton, basse et contrebasse à 3, 4 et 5 cylindres suivi d'exercices pour l'emploi du compensateur* in 1847.[38] The saxotromba is mentioned there only a couple of times and in a very generic manner (thus the soprano, alto, etc. of the *Méthode*'s title probably refer to saxhorns). In a plate with additional information on the alto saxhorn (which Sax calls a tenor), an instrument identical to the alto saxotromba is depicted, but the term saxotromba does not appear.[39] The author has examined many nineteenth-century British instrumental tutors, so far without finding any mention of the alto or baritone saxotromba.

The picture from the compositions for brass is equally bewildering. Works written by Alexander Fessy between 1845 and 1850 use the term "saxhorn alto in E-flat" exclusively. During the 1850s and 1860s several terms were in use. "Saxotromba" reappeared, following its official reintroduction in the ministerial decree of 1854. Hybrid terms such as "bugle tromba" or "saxhorn tromba" appeared, and the term "tromba" was even used to designate the alto instrument of the saxhorn family. Works

37. Forestier, *Méthode complète*, 2.
38. Paris: Brandus et Cie, 1847.
39. Adolphe Sax, *Méthode complète pour saxhorn et saxotromba*, 6.

published by a single composer in the same year used a variety of terms. The baritone saxotromba was not scored for in any of the compositions studied, confirming that it became known as the baritone saxhorn very early.

Most of this music contains parts designated either for the alto saxhorn or for the alto saxotromba: only two pieces that include parts for both instruments have been located. Kastner's *Les cris de Paris* (1857) is a *symphonie dramatique* appearing in his *livre-partition Les voix de Paris.* A movement entitled "Musique d'infanterie" is scored for woodwinds and brasswinds made by Sax. The saxhorn band consists of saxhorns in all registers, although two "sax-trombas" appear in place of the alto saxhorns. In the following movement, "La marche-musique de cavalerie," Kastner has scored for both alto saxhorns and alto saxotrombas. Although in the *Supplément* to his *Traité général d'instrumentation,* Kastner presents the saxotromba as having the more extensive range in the upper register, here there is a tendency for the alto saxhorns to play slightly higher than the saxotrombas, although most of the time there is a blending and crossing of voices. The second work containing parts both for the alto saxhorn and the alto saxotromba is Fessy's *Bolero et fanfare* (1846), written, according to the title page, "for the new instruments invented by Sax." The same observations can be made for this work with regard to the range of the instruments. Table 6 summarizes the terms used by various nineteenth-century French composers for the alto instrument in 6′ F or 6′ E-flat.

Other supporting evidence for the identification of the alto saxhorn as the alto saxotromba. In the surviving sales catalogs from Sax's workshop, not a single alto saxhorn in E-flat is illustrated, although these are included in the lists of instruments for sale. By contrast, many saxotrombas at this pitch are illustrated. In the latest surviving catalog, dated 1886–87, no alto saxhorns are included in the saxhorn group. Instead, alto saxotrombas appear for sale in their place. The only instruments designated as alto saxhorns in the catalog are the *nouveau* alto saxhorns (with independent-system valves) and alto saxhorns with valves and keys.[40] Surviving *nouveau* saxhorns appear to have the same proportions as the narrow-bore alto instruments at the same pitch with ordinary valves. It

40. Saxhorns with valves and keys were patented by Sax in 1859: French patent no. 39, 371.

TABLE 6. Terms used by various nineteenth-century composers for the alto instrument.

Composer	Work	Date	Nomenclature
A. Fessy	*Pas redoublé*	1845	Sax-horn en Mi♭
A. Fessy	*Fantaisie*	1845	Sax-horn en Mi♭ alto
A. Fessy	*Six grands morceaux composé pour musique de fanfare*	1849	Saxhorn alto Mi♭
A. Fessy	*Chœur d'Eyryanthe*	1850	Saxhorn en Mi♭
A. Fessy	*Deuxième fantaisie*	1850	Saxhorn en Mi♭ Ténores
J. Mohr	*L'Alsacienne valse*	1851	Tromba
J. Mohr	*Le Parisien*	1851	Tromba
J. Mohr	*Ouverture d'Oberon*		Tromba
A. Fessy	*Prière anglaise* *No. 1 God Save the King* *No. 2 Rulle Britannia*	1854	Saxhorn Mi♭
A. Fessy	*Les maréchaux de l'Émpire*	1856	Sax-Tromba Ténore en Mi♭
A. Fessy	*Caroline valse*	1857	Sax-horns Tromba en Mi♭
J.-G. Kastner	*Le cris de Paris*	1857	Saxtromba alto Saxhorn alto
Blancheteau	*Les allies*	1857	Alto ou saxhorn Mi♭
Schiltz	*Le tirailleur*	1858	Saxhorn ou alto Mi♭
Schiltz	*Le camp de salon*	1858	Alto Mi♭ and saxhorn Mi♭
Schiltz	*Marche funèbre*	1858	Saxhorn contr alto Mi♭
Schiltz	*Marche de L'étendard*	1858	Sax-horn ou alto Mi♭
Schiltz	*Le bivouac*	1858	Saxotromba en Mi♭
Blancheteau	*L'Alsacienne*	1864	Saxhorn alto Mi♭
J. Mohr	? No 98	1867	Bugle Trombas Mi♭
J. Mohr	*Polonaise*	1867	Bugle Mi♭
S. Neukomm	*Domine salvum fac Imperatorem*	1868	Sax tromba Mi♭
Schiltz (arr.)	*Marche funèbre* de Beethoven	1868	Saxhorn alto Mi♭
Schiltz (arr.)	*Roméo et Juliette* de Gounod	1868	Saxhorn alto Mi♭
Schiltz	*Hymne de Garibaldi*	1869	Saxhorn alto Mi♭
A. Boscher	*La lyre villageoise*	1870	Alto Mi♭
A. Boscher	*La Bohémien*	1870	Alto Mi♭
Blancheteau	*Le berger de Coulommiers*	1872	Alto Mi♭
Blancheteau	*L'Amboisien*	1876	Alto Mi♭
A. Boscher	*La lyre villageoise*	1880	Alto Mi♭
A. Boscher	*Léona*	1880	Alto Mi♭

appears that here Sax used saxhorn as a generic term rather than to designate an instrument of certain proportions. He preferred the term saxotromba for instruments with dependent or regular valves. What is more, saxotrombas are offered for sale in two forms, bell-up (*à pavillon en l'air*) and bell-forward (*forme horizontale*). This contradicts Sax's 1845 patent, where the saxotromba was specified as having a bell-up form. No baritone saxotrombas appear in this catalog.

Other evidence that the alto saxotromba merged with the saxhorn family and replaced the alto saxhorn is rare and scattered. In *A Descriptive Catalogue of the Musical Instruments at the Royal Military Exhibition London, 1890*, Charles Russell Day writes that "the saxtrombas formed a complete family, but only that in E-flat or F, which was used to replace the horn in military bands, remained in practical use."[41] According to M.-A. Soyer, writing in the *Encyclopédie de la musique et dictionnaire du Conservatoire* (1927), the alto saxotromba in E-flat "still exists and will perhaps continue to exist until the end of time."[42] Soyer's discussion suggests that the term "alto saxhorn" was used in the everyday language of instrument repairers, makers, conductors, and others in place of the term "saxotromba." In official military documents, however, the term "alto saxhorn" was not used, even after the abolition of the cavalry bands in 1867.[43] The confusion that must have occurred through the use of different terms for the same instrument in military and in civilian circles is reflected in the sources and has been described above. The abolition of the cavalry bands (strenuously opposed by Sax, as much of his business income came from sales to the army[44]) resulted in a large number of brass instruments ending up in the bands of the infantry, which had no need of them at the time. Thus, the distinction also faded between brass instruments of the infantry and cavalry, which had been based on their form.

41. London: Eyre & Spottiswoode, 1891, 197–98.

42. M.-A. Soyer, "Saxhorn," in *Encyclopédie de la musique et dictionnaire du Conservatoire,* ed. Albert Lavignac and Lionel de La Laurencie, pt. 2, vol. 3, "Des instruments à vent: De leur principe" (Paris, Librarie Delagrave, 1927), 1457.

43. Ibid.

44. In 1867 Sax published an essay, *De la nécessité des musiques militaires* (Paris: Librairie Centrale, 1867), in which he defended the military bands and called for their continuation. He emphasized the inspirational character of the bands, and he underlined the importance of protecting the instrument-making business, which had developed into a significant industry, exporting products in large quantities and employing many workers. He also believed that the elimination of military bands would be a severe setback for civilian music societies, which were composed mainly of former military bandsmen.

Conclusions

The evidence for the existence of a complete family of saxotrombas is not convincing. As the 1845 patent suggests, it is possible that Sax at first envisaged having both narrow-bore and wide-bore instruments in the contralto, alto, and bass registers. He presented a narrow-bore contralto saxhorn and its four-valve, wide-bore counterpart; in the alto register, there was the narrow-bore saxotromba and the four-valve, wide-bore saxhorn; in the bass register, the narrow-bore baritone saxotromba and the four-valve, wide-bore bass saxhorn. Comparison of the measurements of surviving alto and baritone instruments from the Sax workshop with those of the same models in the 1845 patent drawings shows that the instruments hitherto considered to be alto and baritone saxhorns are in reality alto and baritone saxotrombas in their proportions. All evidence suggests that Sax's plan for creating two complete and distinct families of brass instruments was never realized. Of the saxotromba family, only the alto and baritone instruments seem to have been made, and these were soon merged with the saxhorn family in terminology and usage. The terms "saxotromba" and "saxhorn" were used for alto instruments until late in the nineteenth century without any distinction between them. For the baritone instrument, the term "saxotromba" was abandoned around the middle of the century and replaced with the term "saxhorn." The confusion among makers, writers, musicians, and composers dates from the earliest appearance of the instrument, since it seems that Sax himself was never clear or confident about the exact identity of the saxotromba. The existence of a saxotromba family was a fiction, although the existence of alto and baritone saxotrombas as individuals is definitely a fact. These survive in various public and private collections but are known as alto/tenor and baritone saxhorns.

APPENDIX :

Primary Sources

Adolphe Sax demandeur en condamnation pour contrefaçon contre les sieurs Besson, Raoux, Halary, Buffet jeune, Buffet-Crampon, Tournier et Goumas, Martin frères, Beauboeuf, Victor Jacob, et autres. Audiences des 30 juillet et 13 août 1858, 5 août, 13, 22 et 29 décembre 1859, 5, 12, 19, 26 janvier, 2, 9 et 16 février 1860. Enquête, contre-enquête et plaidoiries. Audiences du 23 février 1860: réquisitoire de M. Mahler. Paris: Imprimerie Centrale des Chemins de Fer de Napoléon Chaix et Cie, 1860.

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