IGNACE DE KEYSER, GÉRY DUMOULIN AND ARNOLD MYERS

Brass instrument production by the Mahillon Company

The name Mahillon is associated with the largest Belgian wind instrument manufactory of the nineteenth and twentieth centuries, with the Brussels *Musée Instrumental du Conservatoire* (today's Musical Instruments Museum; hereafter MIM) and with the classification system for musical instruments that was the basis for that of Erich von Hornbostel and Curt Sachs. The musicological work, but also in part the success of the wind instrument manufactory, is due to Victor-Charles Mahillon (1841–1924), one of the sons of Charles-Borromée Mahillon (1813–1887) who founded the Charles Mahillon Company in 1836.

The Mahillon Company, a family business, was active for a century, until 1936.[1] Their production was almost exclusively limited to wind musical instruments, i.e. flutes, reed and brasswind instruments, and to drums and small percussion instruments. Harmoniums and pianos were later added to the product range, in 1882 and 1894 respectively. Instruments of the violin family, offered in some sales catalogues towards the end of the nineteenth century, were produced by sub-contractors in France. Cymbals, mandolins, guitars, accordions, music boxes etc. were imported and were described as such in these catalogues. Around the turn of the century, the company offered 288 brass instrument models in their trade catalogues, 136 models of reed instruments and 104 flute models. These models are also represented in the catalogues and reports of the various national and international exhibitions in which the company participated and, in limited numbers, in the instruments in museums and private collections today. The history of the company can be read as a mirror of the rapid economic development of Belgium, a country that seceded from the Kingdom of the Netherlands in 1830 – itself conceived as a dam against French expansion by the Congress of Vienna after Napoleon's defeat in 1815.[2] The first instrument makers of the family were Charles (1813–1887) and Barthélemi Mahillon (1817–1884). Their father, Michel Mahillon (1777–1830), died in the skirmishes with the Dutch army in Baillonville and his name is chiselled on the monument to the heroes of the Belgian Revolt on the *Place des Martyrs* in Brussels. A certain degree

[1] Ignace De Keyser, 'De geschiedenis van de Brusselse muziekinstrumenten-bouwers Mahillon en de rol van Victor-Charles Mahillon in het ontwikkelen van het historisch en organologisch discours omtrent het muziekinstrument', PhD Thesis, Ghent University, 1996. Available online at <https://lib.ugent.be/nl/catalog/rug01:000377668?i=0&q=De+Keyser%2C+Ignace>. The six volumes have separate URLs.

[2] The 'Vienna Protocol', a secret treaty between the members of the coalition against the French Empire, signed on 21 June 1814, speaks of 'the most complete amalgamation' between the two countries, Holland and Belgium. This treaty was confirmed by the Congress of Vienna on 31 May 1815. See Jean Salmon, 'Les frontières de la Belgique lors de son indépendance', *Revue belge de droit international* 1 (1998), pp.13–16.

of national pride demonstrated by the fact that the company used the Belgian coat of arms and the motto *L'Union fait la force* in its publicity leaflets and in the signatures on their musical instruments.

Led by competent managers, the company surfed the Belgian economic expansion that was abruptly interrupted by the First World War. The most prominent of these managers, V.-Ch. Mahillon, gained fame as an acoustician, collector[3] and first director of the Brussels Conservatoire Museum.[4] His *Éléments d'acoustique*,[5] which he dedicated to his father, marked his entry into the management of the manufactory by introducing a reasoned method for the construction of wind musical instruments.[6] It was probably also V.-Ch. Mahillon who took the initiative to create the *Musée organographique*, a private collection of musical instruments of the Company. The foundation in 1869 of *L'Écho musical*, a magazine that aimed to develop a loyal public for 'military music, wind bands, choral and symphonic societies', was clearly an initiative of V.-Ch. Mahillon – he was its director. The Mahillon manufactory also had a brass band, *Le Cercle musical*, founded in 1871 and conducted by V.-Ch. Mahillon. One of its first performances was a concert in the Marugg Hall in Brussels for the benefit of the Royal Children's Nursery of Laeken,[7] of which his mother, Mrs. Charles Mahillon, was the president.[8]

MAHILLON FAMILY MEMBERS INVOLVED IN WIND INSTRUMENT MAKING IN BRUSSELS AND LONDON

The Mahillons' involvement in musical instrument making is due to Georg Christian Bachmann (1804–1842), a German clarinetist and wind instrument maker born in Paderborn (Westphalia) who settled in Brussels to become clarinet teacher in 1826 at the School of Music, created by Dutch King William II that year. In 1827, Bachmann married the elder sister of Charles Mahillon, Amélie-Louise (1806–1839), and after her death he married her younger sister Jeanne Mahillon (1811–1851). Both Barthélemi and Charles Mahillon may have learned wind musical instrument making from their brother-in-law, then called Georges-Chrétien Bachmann. Barthélemi's career as a musical instrument maker lasted only a few years. He is called 'luthier' on the death certificate of his sister Amélie-Louise, and in the marriage record of Georges-Chrétien Bachmann with Jeanne Mahillon of the same year. In his own 1842 marriage record he is still called 'luthier', but a year later, according to the birth record of his son Charles, he had already become an armourer (*armurier*). The death of Georges-Chrétien Bachmann in 1842 coincides with the end of Barthélemi's career as a musical instrument maker. The armament making branch of the Mahillon family, founded by

[3] Ignace De Keyser and Saskia Willaert, 'Celebrating the Art of Musical Instrument Making: the Musée d'organographie musicale of the Brussels Mahillon Company (1870–1883)'. In Christina Linsenmeyer (ed.), *Colonialism, Provenance, and Musical Instrument Collectors, 1850–1940* (Oxford: Routledge, Francis & Taylor Group), forthcoming.

[4] Victor-Charles Mahillon, *Catalogue descriptif et analytique du Musée instrumental du Conservatoire royal de musique de Bruxelles*, vol.1 (Ghent: Ad. Hoste,1893); vol.2 (Ghent: Ad. Hoste, 1909); vol.3 (Ghent: Ad. Hoste, 1909); vol. 4 (Ghent: Ad. Hoste, 1912); vol.5 (Brussels: Th. Lombaerts, 1922). Reprint (Brussels: Les Amis de la musique, 1978).

[5] Victor-Charles Mahillon, *Éléments d'acoustique musicale et instrumentale comprenant l'examen de la construction théorique de tous les instruments de musique en usage dans l'orchestre moderne* (Brussels: C. Mahillon, 1874); available online at <https://digilib.mpiwg-berlin.mpg.de/digitallibrary/jquery/digilib.html?fn=/permanent/library/G3A3Z6WH/pageimg>.

[6] Victor-Charles Mahillon published the results of his further research on the end correction of wind instruments as *Études expérimentales sur la résonance des colonnes d'air de forme conique, tronc-conique et cylindrique. Extrait du tome III du Catalogue du Musée du Conservatoire de musique de Bruxelles* (Gand: C. Annoot-Braeckman, Ad. Hoste, Succr, 1900). English translation by Major F. A. Mahan as *Experimental Studies on the Resonance of Conical Trunco-conical and Cylindrical Air-columns* (London: C. Mahillon & C°, no date) and as *Quelques expériences sur la vibration des tuyaux à bouche et à anche. Extrait du tome IV du Catalogue du Musée du Conservatoire de musique de Bruxelles* (Gand: Ad. Hoste, 1910). Mahillon's research results were formalized and published in German by Friedrich August Drechsel, *Zur Akustik der Blasinstrumente* (Leipzig: Paul de Wit, 1927). Reprint by Hermann Moeck & Otto Steinkopf, *Kompendium zur Akustik der Blasinstrumenten nach Victor-Charles Mahillon* (Celle: Moeck, 1979).

[7] 'Nouvelles', *L'Écho musical* (15 April 1871), p.[iv].

[8] *Fondatrice de la Crèche royale du faubourg de Laeken, Madame Mahillon y occupa les fonctions de présidente*. See Nécrologie, *L'Écho musical* (22 July 1876), p.[i].

Barthélemi, has also become famous.

From Charles Mahillon's marriage with Mathilde-Claire Persy (1821–1876), 14 children were born (see Figure 1 in the colour section), among them four girls. Marie-Victorine married the London lawyer Edouard Johnson.[9] Four sons entered the music industry: Victor-Charles (1841–1924) and Joseph-Jean (1848–1923) succeeded their father in the music instrument manufactory in Brussels. Adolphe-Désiré-Hypolite (1851–1906) ran the music shop, which opened its doors on 1 January 1876 on the Place de Brouckère in Brussels. Between February 1876 and March 1879, Ferdinand-Charles-Eugène (1855–1948) participated in the running of the sheet music business;[10] he managed the London branch[11] of the Company between 1879 and 1920. Charles Mahillon remained the leader of his company until the mid-1860s. The succession was organized in several stages, through five companies. In 1864, Charles and his son Victor-Charles founded a company called *C. Mahillon* for the production, sale and distribution of musical instruments. This company was dissolved in 1872, replaced by another one with the same name in general partnership (*en nom collectif*), in which Joseph Mahillon was also involved. After ten years Charles Mahillon retired from his duties in this company. In turn, Victor-Charles and Joseph consolidated their participation in the management and planned their succession by their respective sons in a new company *Mahillon et C^ie^*, founded in 1890. On 30 December 1897, V.-Ch. Mahillon's sons, Fernand-Victor (1866–1922) and Albert (1870–1935), were effectively involved in *Mahillon et C^ie^* as contracting parties. This company was supplemented by another of the same name on 16 June 1906 in which only Fernand Mahillon took part, besides Victor-Charles and Joseph Mahillon. In practice, Fernand-Victor gave a mandate to his uncle Joseph to run the company. This 1906 company was dissolved on 30 June 1921 and was not replaced by a new one. Fernand-Victor was designated as liquidator; Joseph and Victor-Charles relinquished the trading capital of the company in exchange for an annuity and a succession settlement. Fernand-Victor Mahillon died on 6 December 1922, his uncle Joseph-Jean soon after on 19 July 1923, and his father Victor-Charles on 17 June 1924. According to the dissolution act of 1921, the Mahillon company passed to Fernand-Victor Mahillon's heirs, Marthe (*b* 1893) and Simone Mahillon (*b* 1894). They sold the company in 1936 to Jean-Adrien Smits, who originated from Tilburg (The Netherlands).

MILITARY AND CIVIL BANDS

The larger context in which the Mahillon company operated was that of military and civil wind bands. At the Brussels Royal Conservatoire of Music, founded in 1832 on the premises of the School of Music created by Dutch King William II in 1826, a former professor of harmony and composition at the Paris Conservatoire, the Belgian[12] François-Joseph Fétis (1784–1871), became the first director. In October of that year, Fétis presented to the President of the Board of Directors of the Conservatoire his *Plan d'organisation de la musique dans le Royaume de Belgique*, or Music Plan for the Kingdom of Belgium:[13]

> Écoles, théâtres, fêtes musicales, concerts, tout doit être réglé par un système unique, organisé par un homme habile et protégé par le gouvernement. C'est à ces conditions que le génie des Belges pour l'art musical se développera de nouveau.
>
> Schools, theatres, musical festivals, concerts, everything must be regulated by one single system, organized by a skilful man and protected by the government. Under these conditions the Belgians' genius for the art of music will flourish again.

The 'skilful man' Fétis refers to was none other than himself, invested with 'boundless authority' which he hoped to establish as director of the Conservatoire.

[9] On the occasion of their marriage in 1861, and also in their marriage contract, 30-year-old John Boosey acted as a witness. His involvement in the family life of the Mahillons points to good contacts between the latter and the London music industry (see below).

[10] In 1871, the Mahillon company began publishing scores for brass bands and wind bands, including a polka by Victor-Charles Mahillon himself, *L'Insouciante*. A year later, the company took over C. Panne's *Publications populaires*. The music shop, run by Adolphe Mahillon, opened its doors on 1 January 1876 on the Place de Brouckère in Brussels. Between February 1876 and March 1879, his brother Ferdinand also participated in the running of the sheet music business.

[11] By 1862, Boosey & Sons, 24 Holles Street & Oxford Street, represented Mahillon & Co in London. See *Exposition de Londres en 1862. Belgique. Catalogue des produits industriels et des œuvres d'art* (Brussels: Charles Lelong, 1862), p.163.

[12] Fétis was born in Mons (the birthplace of sixteenth-century composer Orlandus Lassus) that belonged to the Austrian Netherlands at the time of his birth, but was part of Belgium from 1830 onwards.

[13] Koenraad Buyens, 'Muziek en natievorming in België: het muziekleven te Brussel, 1830–1850', *Bijdragen en mededelingen betreffende de geschiedenis der Nederlanden* 121 (2006), p.402.

The success of Fétis at the Conservatoire is undeniable. Outside the Conservatoire, at the *Monnaie* Opera and among professional orchestras, his influence was rather limited.[14] In his analysis of Fétis's music plan, Koenraad Buyens, not entirely unjustifiably, defines its author as 'a musical commander-in-chief, perhaps inspired by Napoleon's titanic model'.[15] Let us remember that the Paris Conservatoire was primarily intended to train musicians for the celebrations of the Revolution.[16] The drill associated with 'solfeggio' is of military inspiration. Fétis's music plan had of course consequences in the development of civil bands as well. Army musicians became directors of civilian wind bands and those in turn imitated army bands in the use of repertoire, the marching tradition, the use of uniforms etc. Belgium was not an exception in that respect: a parallel evolution took place in all other European countries, including the UK. However, the resurgence of civil bands was enormous for 'little Belgium' (see Figure 2 in the colour section).[17]

The demand for wind band instruments and the market for the army instruments were major elements in the early development of the Mahillon Company, recorded in the reports of national and international exhibitions of industry in the first place (extant Mahillon instruments of this early period are relatively rare).

But first, competition. If there is one concept that characterises socio-economic relations in the nineteenth century – and still today – better than any other, it is that of 'competition', 'emulation', or the expected result of these actions, 'progress'. Indeed, social, economic and political factors determine the evolutionary success of musical instruments and, in the case we are interested in, of the wind instruments, whether it be their enormous production in France after the Revolution of 1789, or the workers' brass bands in the United Kingdom from around 1845 onwards, or the national symbol typified by the alphorn for Switzerland.[18]

The Mahillon Company was from the beginning in open and explicit competition with the Sax family. In 1842 Adolphe Sax left Brussels for Paris. In an open letter to his father, Charles-Joseph Sax, published in 1847, Charles Mahillon reproaches him for not giving other musical instrument makers the opportunity to shine and to take advantage of public orders: 'Mr Sax is angry with all the makers: he does not forgive them for wanting a little place in this sun that warms him so well'.[19]

This first controversy between Sax and Mahillon concerned the market for military musical instruments, specifically infantry trumpets, bugles, and drums. Charles Mahillon stated that he supplied instruments to the Belgian Army from the very beginning of his manufactory's existence:[20]

> J'ai fabriqué toutes les trompettes à cylindre en usage dans les musiques militaires du pays; j'ai fourni, et cela depuis 15 ans, au régiment d'élite, aux 1er, 3me, 7me et 10me régiment de ligne, tous les instruments nécessaires pour les corps de musique et fanfares. Bien plus, à l'exception de deux ou trois trompettes à cylindre de Muller de Mayence, tous les instruments de ce genre sont de moi.
>
> I have made all the trumpets with cylinders in use in the military bands of the country; I have supplied,

[14] As an example, it was not Fr.-J. Fétis, but Joseph-François Snel, music director of the Brussels *Société de la Grande-Harmonie*, who facilitated the first concert conducted by Hector Berlioz abroad on 26 September 1842. At the Monnaie Opera Charles-Louis Hanssens revived the orchestra, and from 1848 his nephew and namesake conducted the orchestra of the *Association des Artistes Musiciens*.

[15] Buyens (2006), p.402.

[16] Constant Pierre, *B. Sarrette et les origines du Conservatoire national de musique et de déclamation* (Paris: Brévan, 1895), pp.146–160.

[17] The statistics have been taken from Griet Lemmens, 'Muziekverenigingen in Brabant tijdens de 19e eeuw', Master's Thesis, Leuven, 1999, pp.2, 11, 14, 15, 19 and 22, available online at <http://www.ethesis.net/muziek_brabant/muziek_brabant_deel_1.htm>. For the period before 1840, no sufficient data is available to establish the exact number of musical societies, but the upward trend until the First World War is evident. In the 1870s, brass bands were particularly popular, especially in the industrial regions of Hainaut and the urban hinterlands of Ghent, Brussels and Liège. The 100 musical societies from the 1880s for which no data is available are included in the grand totals, but are not shown as such in the graph.

[18] Sabine Klaus, 'More Thoughts on the Discipline of Organology', *Historic Brass Society Journal* 14 (2002), pp.1–10.

[19] 'M. Sax en veut à tous les facteurs: il ne leur pardonne pas de vouloir une petite place à ce soleil qui le réchauffe si bien.' Charles Mahillon, Réponse à M. Sax, père, *La Belgique musicale*, 4 March 1847, pp.1–2.

[20] Charles Mahillon (1847), p.2.

> and that for 15 years, to the elite regiment, to the 1st, 3rd, 7th and 10th regiments of the line, all the instruments necessary for the music corps and brass bands. Moreover, with the exception of two or three trumpets with cylinders made by Muller from Mainz, all the instruments of this kind are mine.

The term 'cylinder' was used for two different valve types: the so-called Vienna valves (properly double-piston valves) and for rotary valves. According to V.-Ch. Mahillon, the 'cylinders' used in the 1840s were double-piston valves. Referring to a trumpet attributed to Charles-Joseph Sax (B.B.mim 0627),[21] he remarks: 'This system of cylinders was very much in demand in Belgium around 1837'.[22] Mahillon's assertion is supported by the presence of musical instruments with rotary valves built by Georges-Chrétien Bachmann at the Brussels MIM.[23] Charles Mahillon also claimed to have supplied instruments to England in 1846, and he specifies their nature:[24]

> Dans le courant de l'année dernière seulement [1846] [j']ai fourni pour les régiments anglais plus de deux cents instruments [...] au nombre desquels étaient des bas-tuba, tenor-tuba, bas-horn, tenor-horn, alt-horn, etc., et enfin tous ces instruments que dans la maison Sax on appelle avec une modestie caractéristique, *Saxhorns*.
>
> In the course of last year alone [1846] I delivered to the English regiments more than two hundred instruments [...] among which were bass-tuba, tenor-tuba, bass-horn, tenor-horn, alt-horn, etc., and finally all those instruments which are called *Saxhorns*, with a modesty typical for the company of Mr. Sax.

The report of the jury of the National Industry Exhibition of 1847 confirms that Mahillon included the whole family of bugle horns in its assortment:[25]

> 1. une basse-tuba ou contre-basse d'harmonie en fa [...]; 2. un tenor-tuba en si bémol, pouvant remplacer avantageusement l'ophicléide; 3. un tenor-horn ou bugle-tenor en si bémol, destiné à remplacer le cor dans la musique de cavalerie; 4. un alt-horn en mi bémol alto.
>
> 1. a bass tuba or contrabass in F [...]; 2. a tenor tuba in B♭, which can be used to replace the ophicleide; 3. a tenor-horn or tenor bugle in B♭, intended to replace the horn in cavalry music; 4. an alto horn in E♭.

Charles Mahillon not only used German nomenclature, but also the corresponding register indications. Moreover, in this open letter, which in reality was a polemic against Charles-Joseph Sax, he concluded that his brass instruments did not differ in any way from saxhorns or vice versa. Apparently, Charles Mahillon believed in 1847 that saxhorns were derived from German antecedents.

Moreover, the few examples of this early production of musical instruments by the Mahillon Company clearly show a German or Austrian influence. They include a tenor tuba in B♭ (B.B.mim 1981.017) in a form inspired by the tuba developed by Wieprecht and Moritz in 1835, but with four valves instead of five;[26] a trumpet (B.B.mim 4371) with double-piston valves and levers; this one is similar to another made by Barthélemi Mahillon (B.B.mim 1307); and, finally, a signed basse (B.B.mim 1279) with three double-piston Vienna valves (see Figures 3, 4, 5, and 6; for Figures 4 and 5 see also the colour section). According to V.-Ch. Mahillon, this last instrument dates from 1846.[27]

BUGLE HORNS AND TUBAS

The Mahillon Company started with valved bugle horn types in the German tradition; they presented an entire saxhorn family at the 1867 Paris International Exhibition – however without

[21] The sigla for musical instrument collections used here follows https://cimcim.mini.icom.museum/resources/sigla-for-musical-instrument-collections-new/.

[22] Victor-Charles Mahillon, *Catalogue descriptif et analytique du Musée instrumental du Conservatoire royal de musique de Bruxelles* (Ghent: Ad. Hoste, 1909), vol.2, p.35.

[23] See the cornet (B.B.mim 1292), the trumpet (B.B.mim 1308) and the Viennese bombardon (B.B.mim 1282), which were originally equipped with double-piston valves, but were later replaced by rotary valves.

[24] Mahillon (1847), p.2.

[25] *Rapports du jury et documents de l'exposition de l'industrie belge en 1847* (Bruxelles: M. Hayez, 1848), p.360.

[26] Compare this tuba with the one signed *Verfertigt von C.W. Moritz Königl. Hof Instrumentenmacher Friedrichgracht n 50 Berlin / n 73 / die patentirten Erfinder F.W. Wieprecht, J.G. Moritz academische Künstler* (B.B.mim 1281). This example was part of the collection of Adolphe Sax (no. 273) which was auctioned in 1877. Victor-Charles Mahillon, *Catalogue descriptif et analytique du Musée instrumental du Conservatoire royal de musique de Bruxelles* (Ghent: Ad. Hoste, 1909), vol.2, pp.447–448.

[27] Mahillon (1909), pp.445–446.

mentioning the brand name 'saxhorn.' Eventually, at the end of the century, they adopted generic names for the instruments of the valved bugle type in a coherent register designation. The shift in the register designation (Table 1) gives us an idea of the evolution of their range over the years and of their adaptation to a growing international market.

Figure 3. *Tenor tuba in B♭ (B.B.mim 1981.017).*

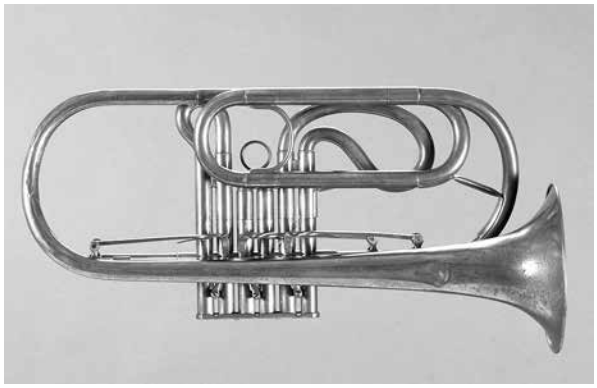


Figure 4. *Trumpet with double-piston valves and levers (B.B.mim 4371). (See also colour section)*

Figure 6. *Basse (B.B.mim 1279).*

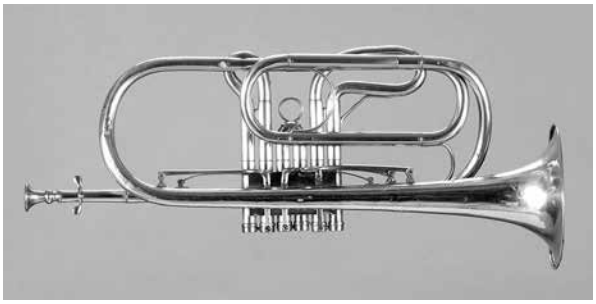


Figure 5. *Trumpet by Barthélemi Mahillon (B.B.mim 1307). (See also colour section)*

Table 1. *Nomenclature of valved bugle types by the Mahillon Company. The 1896 names are those commonly used in Britain for these instruments at that time.*

1841 Exposition nationale (belge)	1851 Exhibition of all nations	1867 Catalogue explicatif	1879/03/01 Supplément à L'Écho musical	1896 General illustrated Catalogue	1913 Catalogues Bugles/ Tubas / Basses et contrebasses
		Bugle soprano en mi bémol à 3 pistons	Soprano en mi♭	Soprano flugelhorn in E flat (3 valves)	Bugle sopranino en mi♭ à 3 pistons
		Bugle ténor en si bémol dit Flugelhorn à 3 pistons et à 4 cylindres de rotation	Contralto en si♭	Flugelhorn in B flat (3 valves / automatic regulating pistons)	Bugle soprano en si♭ à 3 pistons
Alt-horn en mi♭		Bugle alto en mi bémol à 3 pistons (différents modèles); idem à 5 pistons (nouveau système)	Alto à 3 pistons	Tenor horn in E flat (3 valves / automatic regulating pistons)	Bugle alto en mi♭ à 3 pistons
Tenor-tuba en si♭ Tenor horn en si♭ Bugle ténor en si♭		Bugle baryton en si bémol à 3 pistons	Baryton à 3 pistons	Baritone in B flat (3 or 4 valves / 3 automatic regulating pistons)	Bugle ténor (barytons) en si♭ à 3 pistons
Basse-tuba en fa	Bugle basse	Ténor-basse en si bémol à 4 pistons ou à 4 cylindres rotatifs	Ténors-basses ou tubas en si♭ à 3 ou 4 pistons / cylindres de rotation Basse chantante	Euphonium in C (3 and 4 valves / 4 automatic regulating pistons) and with 5 valves	Basse ou Tuba en si♭ (3 ou 4 pistons)
	Bugle contrebasse	Bombardon en mi bémol à 3 ou 4 pistons et en fa (4 pistons) (aussi de forme circulaire)	Bombardons en mi♭ (à 3 ou 4 pistons) (aussi modèle rond)	Bombardon in E flat or F (3 or 4 valves) (upright and circular)	Basses ou bombardons en mi♭ (3 ou 4 pistons) et en fa (4 pistons) (aussi de forme circulaire)
		Contrebasse en si bémol à 4 pistons ou 4 cylindres à rotation (aussi de forme circulaire)	Bombardons en si à 3 pistons (aussi modèle rond)	Bombardon in BB flat (3 valves) (upright and circular)	Contrebasse en si♭ (3 ou 4 pistons) (aussi de forme circulaire)
					Double contrebasse en si♭

The refusal to use the name 'saxhorn' for the instruments of the valved bugle type could have been influenced by the antipathy between Victor-Charles and his father Charles Mahillon and their most important competitors in the 1830s, Charles and Adolphe Sax. However, one cannot dispute the importance of the pedagogical and practical aspects that Adolphe Sax incorporated into his variant of the valved bugle family, the family of saxhorns.[28] The use of the same fingering and the one clef in the parts allowed all saxhorns from high to low to be played with more facility by their users – mostly amateur musicians, but also military musicians who did not necessarily belong to a class of top virtuosos.

The success of valve instruments is sometimes explained as a 'wildfire' that spread among brass

[28] Ignace De Keyser, 'The Creation of Genius in 19th Century Music: The Case of Adolphe Sax', in Adrian von Steiger, Daniel Allenbach and Martin Skamletz (eds.), *Das Saxhorn. Adolphe Sax' Blechblasinstrumente im Kontext ihrer Zeit. Romantic Brass Symposium 3* (Schliengen: Argus, 2020), pp.113–145. Musikforschung der Hochschule der Künste Bern Herausgegeben von Martin Skamletz und Thomas Gartmann Band 13, available online at <https://www.hkb-interpretation.ch/fileadmin/user_upload/documents/Publikationen/Bd.13/HKB13_113-145_DeKeyser.pdf>.

wind instruments because of their superior technology.[29] In fact, bugle horn types with valves (including saxhorns and tubas) were further evolutions of such instruments as keyed bugles and keyed ophicleides.[30] The reason why the success of these latter two categories did not last was not so much their inherently poor intonation, but rather the high technical skills that were required from the performers in order to play them correctly. This is how the famous composer, orchestrator and conductor Hector Berlioz evaluated them:[31]

> De même que le bugle à clef, le plus faux des instruments de cuivre, l'ophicléide, a son tube percé de trous énormes dont la fermeture s'opère par un corps étranger et des plus dissemblables avec la matière de l'instrument; la peau épaisse qu'on emploie pour cela [...] produit naturellement l'effet d'une sourdine. En outre, le tube de l'instrument subit à chaque instant de nouvelles modifications qui rendent sa sonorité inégale, à cause du plus grand nombre de clefs qui restent encore ouvertes [...]. De là l'excessive rareté des artistes qui jouent juste sur cet instrument, rareté telle qu'on en compte à peine trois à Paris, en tête desquels il faut placer M. Caussinus, professeur au Gymnase musical.
>
> The ophicleide – just like the keyed bugle, the most out-of-tune playing brass instrument – has its tube pierced with enormous holes, the closing of which is done by a foreign body most dissimilar to the material of the instrument; the thick skin used for this purpose [...] naturally produces the effect of a mute. Moreover, the tube of the instrument undergoes new modifications at every moment which make its sound uneven, because of the greater number of keys that remain open [...]. Hence the excessive rarity of artists who play this instrument correctly, a rarity such that there are barely three in Paris, of whom M. Caussinus, a professor at the *Gymnase musical*, is the most prominent.

The unspoken conclusion is of course: that if only the ophicleide teacher of the *Gymnase musical* (the Paris 'conservatoire' for army musicians) is able to play an ophicleide correctly, then the instrument is of no use to the great mass of less gifted pupils – which is exactly why those musicians chose the valved alternatives. In 1858, Charles Mahillon patented a valve mechanism with valves standing at a right angle to the main tube (Belgian patent 6547 of 7 October 1858, see Figure 7). He probably intended it for the series of bugle horns illustrated. According to the patent description, this construction allowed an easier fingering and prevented players from being hindered by condensation water. Several receipts kept in MIM prove that Mahillon paid taxes for this patent at least until 1862.[32] He thus intended to exploit it commercially.

A bass bugle horn with four valves and with signature C. MAHILLON / BRUXELLES (B.B.mim 1995.022, see Figure 8) confirms that it was put into production.

This instrument is a *basse* in 9-ft B♭, so it cannot be compared, strictly, with valved ophicleides: as widely used these were in F or E♭. Typical valved ophicleides in F or E♭ have a brassiness potential in the range 0.45 to 0.6.[33] However, except for the form of the valves, Mahillon's patent can be compared with that of Ch-J. Sax from 1842 (Belgian patent 2256 of 7 July 1842) for a 'new combination of tubular valves to be applied on ophicleides and other bass instruments in brass or wood' (*une nouvelle combinaison de cylindres applicables aux ophicléïdes et aux autres instruments basses, en cuivre et en bois*). The 'combination' represented by Charles-Joseph Sax is a valve mechanism with five double piston (so-called 'Vienna') valves put at a right angle to the main tube. At the 1862 London Exhibition of all Nations, Mahillon appeared with a complete series of valved bugles, from the soprano in E♭ down to the contrabass in B♭, with either rotary valves or Périnet valves

[29] Niles Eldredge, 'Evolution in the market place', *Structural Changes and Economic Dynamics* 8 (1997), pp.385–398, at p.394. Niles Eldredge uses the argument of a 'wildfire' specifically for cornets, but his reasoning of course applies to the evolution of brass instruments in general at this time.

[30] Ignace De Keyser, 'The Keyed Ophicleide as a Paradigm in the Development of New Wind Instruments in the 1830s and 1840s'. In *Vom Serpent zur Tuba. Entwicklung und Einsatz der tiefen Polsterzungeninstrumente mit Grifflöchern und Ventilen. XLI. Wissenschaftliche Arbeitstagung und 33. Musikinstrumentenbau-Symposium Michaelstein, 7. bis 9. November 2014* (Augsburg; Wissner Verlag, 2019), pp.69–88; Michaelsteiner Konferenzberichte Band 83.

[31] Hector Berlioz, 'De la réorganisation des musiques militaires', *Feuilleton du Journal des débats*, 1 April 1845, pp.2–3.

[32] Receipt dated 30 September 1859 for 20 Belgian francs (BF), another dated 19 September 1860 for 30BF, a third dated 5 September 1861 for 40BF and a fourth dated 16 September 1862 for 50BF.

[33] Bombardons and tubas in F and E♭, in comparison, have a brassiness potential in the range 0.25 to 0.45. See Arnold Myers, 'The Valved Ophicleide: A Broken Promise', *Liranimus* 2 (2013), pp.9–21.

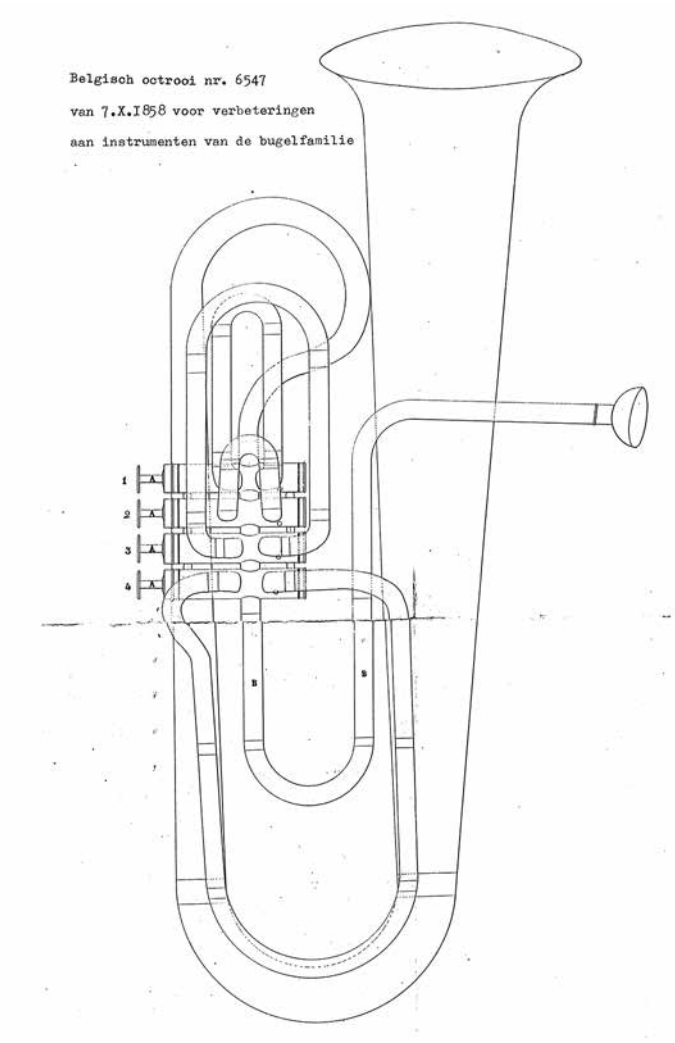


Figure 7. *Patent drawing for a valve mechanism with valves standing at a right angle to the main tube (Belgian patent 6547 of 7 October 1858).*

Figure 8. *Bass bugle horn with four valves and with signature C. MAHILLON / BRUXELLES (B.B.mim 1995.022).*

(*une série d'instruments de cuivre à cylindre à rotation, depuis le soprano en mi bémol jusqu'au bombardon contrebasse en si bémol. La même série d'instruments à pistons*).[34] The compasses given for the different sizes indicate a nomenclature similar to that of Adolphe Sax: the high E♭ instrument is called a soprano, the contrabass instrument is in 18-ft B♭.[35] At the 1867 World exhibition in Paris, the Mahillon Company added helicons to its range: circular contrabass bombardons in E♭ and B♭. All brass instruments presented there were equipped with either rotary valves, cylinder valves or piston valves.[36] Fétis treated the bugle horns made by the Mahillon firm very generally in his report on the 1867 Paris World exhibition, ranking them with the better instruments of their kind:[37]

[34] *Exposition universelle de Londres 1862. Belgique. Catalogue des produits industriels et des œuvres d'art* (Bruxelles: Charles Lelong, 1862), p.103.

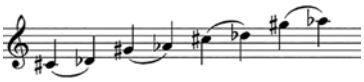
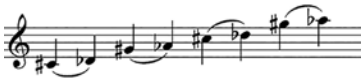
[35] See 'Tableau comparatif des dénominations des registres des saxhorns', in M. Haine and I. De Keyser, *Catalogue des instruments Sax au Musée instrumental de Bruxelles suivi de la liste de 400 instruments Sax conservés dans des collections publiques et privées* (Brussels: Musée instrumental, 1980), pp.135–136.

[36] Manufacture générale d'instruments de musique C. Mahillon, *Catalogue explicatif des instruments figurant à l'Exposition universelle de Paris en 1867* [Brussels: C. Mahillon, 1867], pp.6–7 (Conservatoire royal de musique de Bruxelles, Fonds Fétis V.30200).

[37] [François-Joseph] Fétis (rapporteur), 'Classe X. Instruments de musique.' In *Exposition universelle de Paris en 1867. Documents et rapports* (Brussels: E. Guyot, 1868), vol.1, pp.471–551, at p.536.

> Les meilleurs saxhorns ou bugles des voix de soprano, contralto, ténor, baryton, ou basse et contrebasse, soit sous le rapport du timbre, soit sous celui de la justesse et de la netteté d'articulation sont ceux de MM. Sax, Courtois, Lecomte et C^ie^, Martin (Jules), Millereau, Mahillon, M^me^ Besson, MM. Bohland, de Graslitz; Cerveny, de Koeniggrätz; Distin, de Londres et Lannsmann [sic], de Linz.
>
> The best saxhorns or flugelhorns for soprano, contralto, tenor, baritone, or bass and contrabass registers, either in terms of timbre or in terms of accuracy and clarity of articulation, are those of Messrs. Sax, Courtois, Lecomte et Cie, Martin (Jules), Millereau, Mahillon, Mrs. Besson, Messrs. Bohland, from Graslitz; Cerveny, from Koeniggrätz; Distin, from London and Lannsmann [sic], from Linz.

V.-Ch. Mahillon joined the management of his father's Company in 1865. His influence can be seen in the models he himself patented and in the specifications given in his *Éléments d'acoustique*. In the *Catalogue explicatif*, which the Mahillon firm published for the 1867 Paris World Exhibition, a tenor horn invented by V.-Ch. Mahillon is described *in extenso*.[38] It is equipped with five valves, three ordinary descending valves (descending 1, ½, and 1½ tones respectively) and with two 'chromatic' valves; one ascending a chromatic semitone, the other descending a chromatic semitone. According to its designer in the *Catalogue […] du Musée instrumental*, these are the advantages of the simultaneous use of a 'chromatic' valve with the ordinary ones:[39]

> Il résulte de leur emploi : 1° que toutes les positions amenées par les trois pistons de la main droite peuvent être instantanément transposées d'une demi-ton à l'aigu ou au grave ; 2° qu'une note quelconque, diésée ou bémolisée, peut, tout en conservant son doigter usuel, s'abaisser ou se hausser par le simple emploi de l'un des deux pistons supplémentaires ; 3° une très grande facilité pour l'exécution des gammes chromatiques ascendantes ou descendantes ; 4° une amélioration sensible dans la justesse des notes  qui dans l'ancien système sont fausses à cause de l'emploi de plusieurs pistons, tandis qu'avec le nouveau système, un seul piston, le cinquième, suffit pour assurer une justesse parfaite.
>
> Its use allows: 1. an instant transposition of any piece by a semitone higher or lower; 2. each sharp or flat note to be altered by the supplementary valves, without changing the normal fingering; 3. to facilitate chromatic scales, either ascending or descending ones; 4. to ameliorate the tuning of the notes  which sound badly on the ancient system due to the use of a combination of valves, while on the new system, it only takes a single valve, the fifth, to ensure a perfect tuning.

V.-Ch. Mahillon never submitted a patent for this improvement and had perhaps a good reason not to do so. The *système saxalphomnitonique* patented by Alphonse Sax on 9 October 1856 (French patent 29,431) already presented a combination of descending and ascending valves. In Alphonse Sax's patent the descending valves are the traditional ones, the ascending valves are so to speak 'added' to them, so that the nominal pitch tone lies at the centre of the compass.[40] The instrument of V.-Ch. Mahillon, described here (B.B.mim 2471; Figure 9) bears the signature *C. Mahillon / Bruxelles*, but it never went beyond the prototype stage. With no valves operated it stands in E♮; it plays in F with the 4th valve operated, and in E♭ with the 5th valve operated. The brassiness potential of the instrument is 0.62 which is in the normal range of the *saxhorn tenor*, albeit slightly higher than the average.

V.-Ch. Mahillon abandoned the idea, disappointed as he was by inertia on the part of musicians – which he called 'Dame Routine':[41]

[38] See 'Un bugle alto en mi bémol, nouveau système, à 5 pistons', in *Catalogue explicatif des instruments figurant à l'Exposition universelle de Paris en 1867* [Brussels: C. Mahillon, 1867], pp.6–7 (Conservatoire royal de musique de Bruxelles, Fonds Fétis V.30200).

[39] Victor-Charles Mahillon, *Catalogue descriptif et analytique du Musée instrumental du Conservatoire royal de musique de Bruxelles* (Ghent: Ad. Hoste,1912), vol.4, pp.276–277.

[40] Haine and De Keyser (1980), pp.46–47.

[41] Mahillon (1912), pp.276–278.

> L'instrument catalogué est le seul qui fut construit sur ce principe; l'auteur, convaincu par des tentatives précédentes du peu de succès d'un système quelque bon qu'il soit, dès l'instant qu'il apporte des changements aux habitudes de Dame Routine, renonça à la vulgarisation de son idée.
> The instrument in the catalogue is the only one that was built on this principle; the author abandoned the promotion of his idea, convinced by the lack of success of previous attempts that presented good systems, but which required changes to be made to *Dame Routine's* habits.

V.-Ch. Mahillon continued to improve the family of bugle horns. In 1870 he developed a new flugelhorn, with an ostensibly different sound colour and easy to play. The only source is a vague description given by V.-Ch. Mahillon in *L'Écho musical* of 15 February 1870[42] which says nothing about construction details. V.-Ch. Mahillon only stresses the advantages of the new instrument such as the easy sound emission (*facilité d'émission*), perfect tuning (*justesse d'intonation*) and a mellow sound colour even when used by inexperienced players (*timbre moelleux presqu'inaccessible aux éclats causés par une embouchure inexpérimentée*). This bugle model was probably commercialised as the bugle no. 49. It only appears in the price lists of 1878/1879, where it is described as '*nouveau modèle / proportions nouvelles*'. The 1894 *Catalogue général* mentions several bugle types for artists (*d'artiste*) that are provided with the so-called compensating valves patented by the Mahillon Company in 1886–88 (see below): a *bugle contralto* in B♭ (model no. 432), a *bugle alto* in E♭ (model no. 433), a *bugle baryton* in B♭ (model no. 434), a euphonium in B♭ (model no. 437), a bombardon in E♭ (model no. 442), the same in helicon form (model no. 443) and a contrabass bombardon in B♭ (model no. 493), and in helicon form (model no. 445).[43]

Figure 9. *Alto bugle, C. Mahillon/Bruxelles (B.B.mim 2471).*

THE SEARCH FOR AN AFFORDABLE VALVE SYSTEM FOR AMATEUR MUSICIANS

The valved cornet was adopted rapidly in wind ensembles, both military and civilian. It developed roles in a wide variety of musical contexts, from court balls to guinguettes, from fashionable orchestras – such as those of Philippe Musard and Louis-Antoine Jullien – to village bands. The cornet also asserted itself as an instrument capable of virtuosity, widely exploited in small and large dance bands as well as in military and civilian wind bands and in brass bands. In the opera[44] and in the orchestra, however, scoring for the cornet remained marginal. Between Berlioz's *Symphonie fantastique* (1830), where the cornet is only present in the later versions, or his *Benvenuto Cellini* (1834–1838), and Stravinsky's *Histoire du soldat* (1917), very often trumpet parts were played on the cornet (see below), even though it found a

[42] V.C.M. [Victor-Charles Mahillon], 'Un progrès dans la fanfare', *L'Écho musical* (15 February 1870), pp.[ii]–[iii].

[43] Mahillon & Co Manufacture Générale d'instruments de musique, *Catalogue général. Première partie* (Brussels: [Mahillon & Co], 1894), pp.29–53 passim.

[44] An unusual instance is the requirement for 24 cornets in the stage music of Fromental Halévy's opera *La Magicienne*, which was first performed on 17 March 1858 at the Paris Opéra Garnier. See the archive file: *État de liquidation de sommes dues à diverses parties prenantes (Dépenses du mois de mars 1858)*, Paris CARAN, AJxiii/688.

fairly regular place alongside the trumpets, which were considered to have a nobler sound, mainly in the symphonic and ballet repertoire. The ease of playing the instrument, especially for less experienced musicians, was the fundamental condition for its social acceptance; as a consequence, the search for an affordable valve system is fully applicable to the cornet. The Mahillon firm patented three cornet types. In the first one of 29 April 1853, Charles Mahillon proposed a cornet in post horn form with a removable valve mechanism in what is called 'a cornet system' (*un système de cornet à piston* [sic]). One of his goals was to achieve to a conical bore throughout:[45]

> Je suis parvenu [...] à donner à ce cornet à pistons une forme élégante et toute nouvelle, à y appliquer une coulisse d'accord simple ; et en plaçant les pistons plus en avant de l'embouchure, je suis également parvenu à le démonter en deux parties, pour la facilité de l'exécutant, et à établir un tube conique sur toute l'étendue de l'instrument. Par là j'ai pu lui donner une qualité de son supérieur, et le rendre parfaitement juste.
>
> I succeeded in giving this valve cornet an elegant and completely new form, in applying a simple tuning slide, and in placing the valves nearer to the mouthpiece. I also succeeded in assembling it in two parts for the comfort of the player and in establishing a conical bore throughout the length of the instrument. Hence, I was able to give a superior sound [to this cornet] and to make it play in tune over the whole compass.

Mahillon's concern was not unique at that time: Alphonse Sax, in 1848, worked hard to realize a conical bore throughout (Belgian patent 4410, dated 8 July 1848), which he patented as 'a system with a conical air column' (*système de piston à colonne d'air conique*).[46] His brother Adolphe Sax patented a removable valve mechanism in 1849 (French patent 8351, 5 May 1849).

Charles Mahillon's second cornet patent of 20 July 1857 was also designed to apply a conical tube to the cornet (*pour l'application des tubes-cônes au cornet à piston* [sic]), this time with a fluent S-shape, and a relatively short lead-pipe (Figures 10 and 11):[47]

> J'ai donné aux tubes du cornet à pistons un parcours entièrement nouveau et j'ai appliqué la coulisse d'accord en arrière et touchant aux pistons de manière qu'il n'y a plus d'obstacles à l'application du cône qui existe depuis l'embouchure jusqu'à l'extrémité du pavillon.
>
> I gave to the cornet tubing a completely new progression and I placed the tuning slide at the rear, close to the valves so that there are no longer any obstacles in the application of the cone going from the mouthpiece to the end of the bell flare.

A few such cornets survive in private collections.

The third cornet patent of 25 August 1859, for 'a cornet system without balusters' (*un système de cornet à piston [sic], sans balustre*) concerns a valve type. *Balusters* are barrel-like parts at the top of the valve casings which house the springs. Charles Mahillon's valves are shorter: they no longer have this barrel and the spring is at the bottom. Another advantage might be the shorter distance between valve mechanism and the main tube, so that the player could hold the instrument there. A reminder kept in the archives of the Brussels MIM proves that the taxes for this patent were paid, at least until 1861.[48] Instruments made according to this patent exist in several private collections (Figure 12).[49]

Compensating valves, or '*pistons-régulateurs*' patented by Charles Mahillon in 1886 and 1888, can be found on cornet models 430, 431 and 451, which were probably introduced in the 1890s (see below). The '*perce pleine*' (full bore) models mentioned in the catalogue were the more expensive models: this refers to an innovation introduced by Besson in 1855. Constant Pierre gives the following description of this innovation of Besson:[50]

[45] See Belgian patent 2038B of 29 April 1853.

[46] Haine and De Keyser (1980), p.41.

[47] Belgian patent 4763 C of 20 July 1857.

[48] The reminder from the Service of Registration and Domains is dated 4 September 1861 and concerns the Belgian patent 7902 of 25 August 1859. See Archives Mahillon at Brussels MIM (Dossier Brevets).

[49] See Géry Dumoulin's collection among others.

[50] Constant Pierre, *La facture instrumentale à l'exposition universelle de 1889. Notes d'un musicien sur les instruments à souffle humain nouveaux et perfectionnés* (Paris: Librairie de l'Artiste indépendant, 1890), p.287.

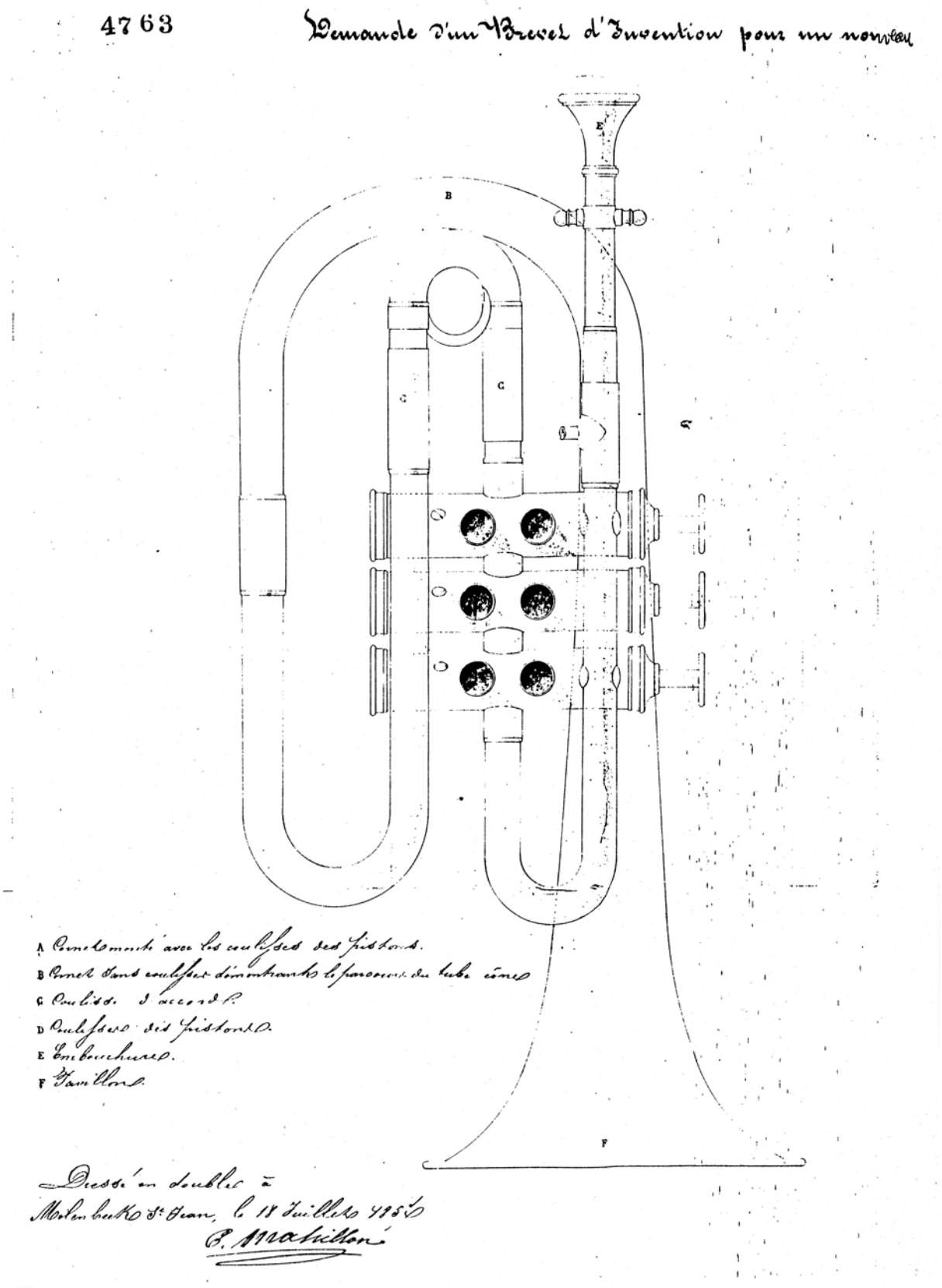


Figure 10. *Patent drawing of the Belgian patent 4763 C of 20 July 1857 designed to apply a conical tube to the cornet.*

Figure 11. *Cornet with 'conical bore' after the 1857 patent (Géry Dumoulin collection). Photo: Simon Egan.*

> La perce est dite pleine et circulaire, lorsque le diamètre des trous et des coquilles est égal à celui du tube du corps sonore; Besson en a revendiqué le premier l'application en 1855. Dans ce cas une sphère de la grosseur du tube principal doit passer dans tous les coudes des tubes additionnels et des coquilles des pistons.
>
> The bore is said to be full and circular when the diameter of the valve ports and coquilles is equal to that of the bore of the main tubing; Besson was the first to claim the application in 1855. In this case a sphere the size of the main tube must be able to pass through all the bends of the additional tubes and the coquilles of the valves.

A full bore through the valves was the claim of many makers. While any change in bore size gives rise to reflections, usually disadvantageous, the bore discontinuity has to be major before it has a serious effect. Quite often, in Périnet valves, the coquilles are slightly constricted where they cross each other. The '*perce pleine*' for cornets was mentioned in the 1867 *Catalogue explicatif* and in the catalogues after 1894. The instruments with rotary valves were German and Austrian models. Cornets no. 86 and no. 82 are comparable to the trumpet no. 379 and can be compared to the Viennese Uhlmann model from 1840 (see above). The cornet no. 5 also has a drum spring and maybe *Pointventile* which are typical for the *Altkölner Model*.[51] From the 1911 catalogue onward, no models with rotary valves were presented. Most of the models shown were surprisingly similar in construction and appearance: long lead-pipe on the right, valves in the centre, bell-pipe on the left. In terms of shape, however, there are two striking exceptions: the cornets in trumpet wrap, model nos. 85 and 86. They are very similar to trumpet models no. 54, the so-called 'Bach' trumpet in D, and to no. 53 in B♭ (see below). From 1911 onwards, there were facilities to accommodate the change in the pitch standard. Most models have at least attachments for B♭ / A, older models also for A♭ / G. The echo cornet on the other hand is worth a special mention in the 1867 *Catalogue explicatif*, but in the 1894 *Catalogue général* the echo device is reduced to an accessory:[52]

> Cornet à écho. Il se fait des modèles 485, 486, 487 et 380, avec une majoration de prix de 60 francs, argenture ou gravure non comprises. Le mécanisme de l'écho est des plus simples et ne gêne en rien les habitudes de l'artiste; il s'enlève à volonté.
>
> Echo Cornet. It is made with models 485, 486, 487 and 380, with an additional price of 60 francs, silvering or engraving not included. The echo mechanism is very simple and does not interfere with the artist's habits; it can be removed at will.

[51] Herbert Heyde, *Das Ventilblasinstrument. Seine Entwicklung im deutschsprachigen Raum von den Anfängen bis zur Gegenwart* (Wiesbaden; Breitkopf and Härtel, 1987), p.142 (Photo 65).

[52] 1894 *Catalogue général*, p.29.

Figure 12. *Cornet with valves 'without balusters' after the 1859 patent (Géry Dumoulin collection). Photo: Simon Egan.*

A 'REGULATING' VALVE (1886–1888)

By the 1880s, several prominent brasswind makers had addressed the intonation problems of valves used in combination[53] by introducing devices to adjust the sounding length of valve instruments. These included Adolphe Sax's 'cornet compensateur' (1843)[54] and independent valves (1852),[55] Gustav Bessons's 'registre' (1853), Pierre Louis Gautrot's 'equitonique' system (1865), David James Blaikley's 'compensating pistons' (1878),[56] and Edmond Daniel's 'ajusteur automatique' (1881).[57] These inventions enjoyed varying degrees of commercial success. Writing in 1886, V.-Ch. Mahillon showed a clear understanding of the problem but was sceptical about the value of such devices:

> Quant à l'adoption des coulisses supplémentaires ou compensatrices, ce moyen d'obvier aux défauts de justesse des sons est loin de donner des résultats qu'on croit pouvoir en obtenir. La raison en est facile à saisir : la colonne d'air se trouvant naturellement plus tourmentée dans sa marche par suite des nombreux circuits qu'elle est obligée de faire, ceux-ci empêchent l'établissement des proportions exactes nécessaires à la production des harmoniques dans leur rapport acoustique, et ils faussent l'instrument tout autant, et même plus, que ne le feraient les insuffisances de longueurs résultant de l'emploi simultané des pistons ordinaires.
>
> Regarding the application of extra tubes or compensating devices, this way to remediate the defaults in tuning is far from giving the results that one hopes to obtain. The reason is quite simple: the course of the air column is more tormented as a result of the numerous circuits that it must follow; these prevent exact proportions to be established, which are necessary for an acoustically balanced production of the harmonics. They tune as badly, and even more so, as when ordinary valves combine with insufficient tube lengths.[58]

Nevertheless, on 6 January 1886 Charles Mahillon deposited a patent for a compensating valve under

[53] Arnold Myers, 'Design, Technology and Manufacture since 1800', in Trevor Herbert and John Wallace, *Cambridge Companion to Brass Instruments* (Cambridge: Cambridge University Press, 1997), pp.115–130; Bruno Kampmann, 'Les systèmes de pistons (suite). 6. Systèmes compensateurs', *Larigot* 7 (March 1990), pp.14–21.

[54] Géry Dumoulin, 'The Cornet and Other Brass Instruments in French Patents of the First Half of the Nineteenth Century', *The Galpin Society Journal* 59 (2006), pp.77–100.

[55] Eugenia Mitroulia, 'Adolphe Sax's brasswind production with a focus on saxhorns and related instruments', PhD Thesis, University of Edinburgh, 2011.

[56] British patent 4618 of 14 November 1878.

[57] French patent 140.868 of 1 February 1881, with supplements of 9 April, 3 June and 21 October 1881. This system was commercialised by François Sudre.

[58] 'Un nouveau progrès instrumental', *L'Écho musical* 5 (4 March 1886), p.49–52.

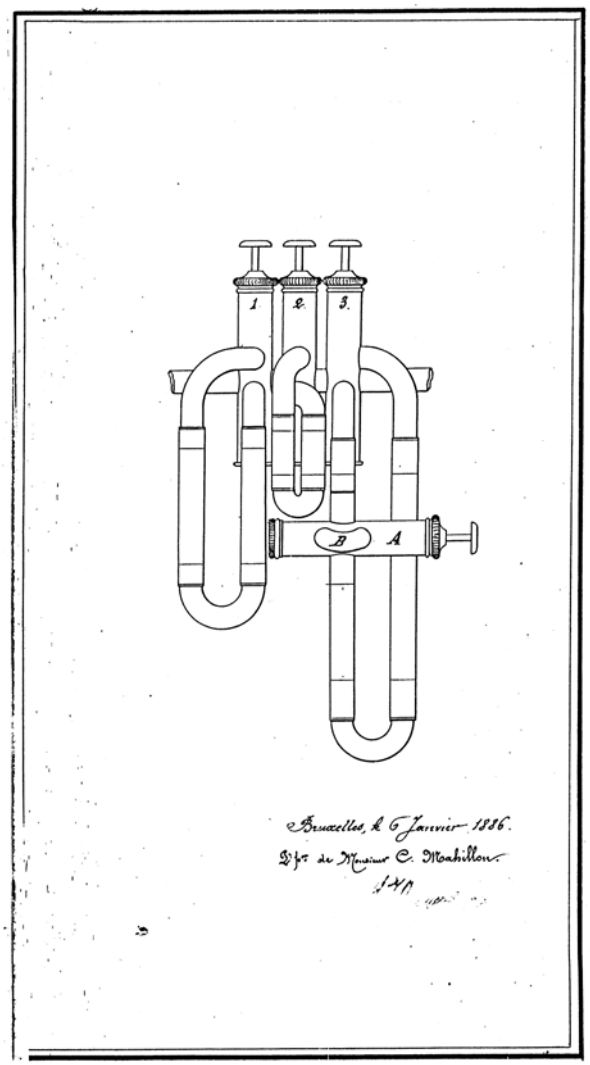


Figure 13. *Drawing from Belgian patent 71515 of 6 January 1886 showing a regulating valve mounted on the 3rd valve loop.*

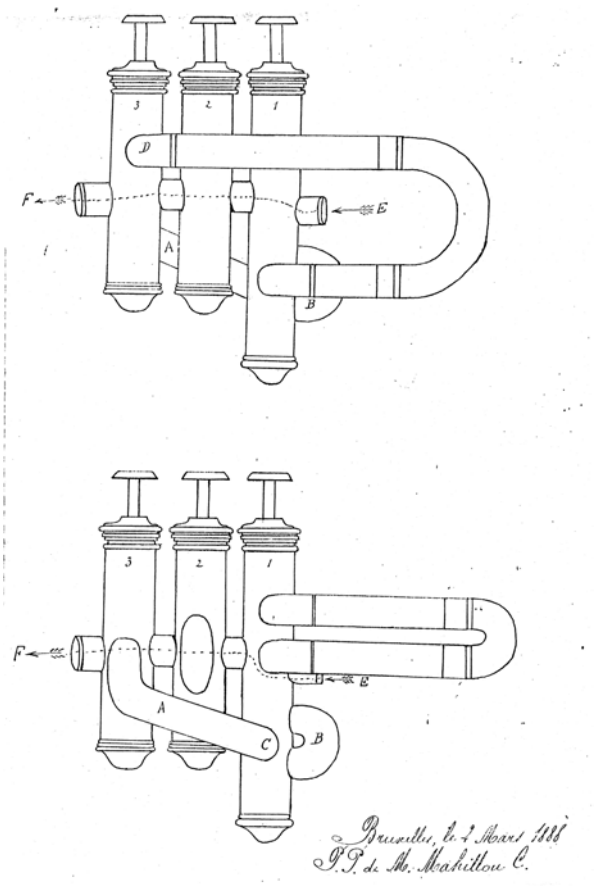


Figure 14. *Drawing from Belgian patent 80.849 of 2 March 1888 showing an extended 1st valve with compensating loop.*

the title 'improvements on brass wind instruments' (*des perfectionnements aux instruments de musique en cuivre*).[59] Two supplements to this patent followed in 1888.[60] The first of the three Mahillon valve systems provided a 'regulating valve' (*piston régulateur*) which was a manually operated fourth valve that rectified the combined action of the 1st and 3rd valves (Figure 13).

In the first supplement to this patent Mahillon made the regulating device automatic: the 3rd valve loop passed through the 1st valve which, when operated, added a short compensating loop to the 3rd valve loop. The 1st valve was extended to accommodate the regulator (*régulateur*), see Figure 14.

In the second supplement the regulating device was again automatic, and again involved the 3rd valve loop passing through an extended 1st valve. Here the 3rd valve loop passed through twice: when the 1st valve was operated the 3rd valve loop was longer than when the 1st valve was not operated, see Figures 15, 16 and 17. Strictly speaking, this device was not compensating (with additional supplementary tubing) but double principle (with alternative tubing).

These Mahillon patents were for a simpler application than the systems being offered by other makers, being limited to one valve combination and thus minimizing the number of 'tormented' valve passages in the circuit while ameliorating the worst intonation problem. Mahillon also patented his

[59] Belgian patent 71515.

[60] Belgian patent 80.849 of 2 March 1888 and no. 82.024 of 2 June 1888.

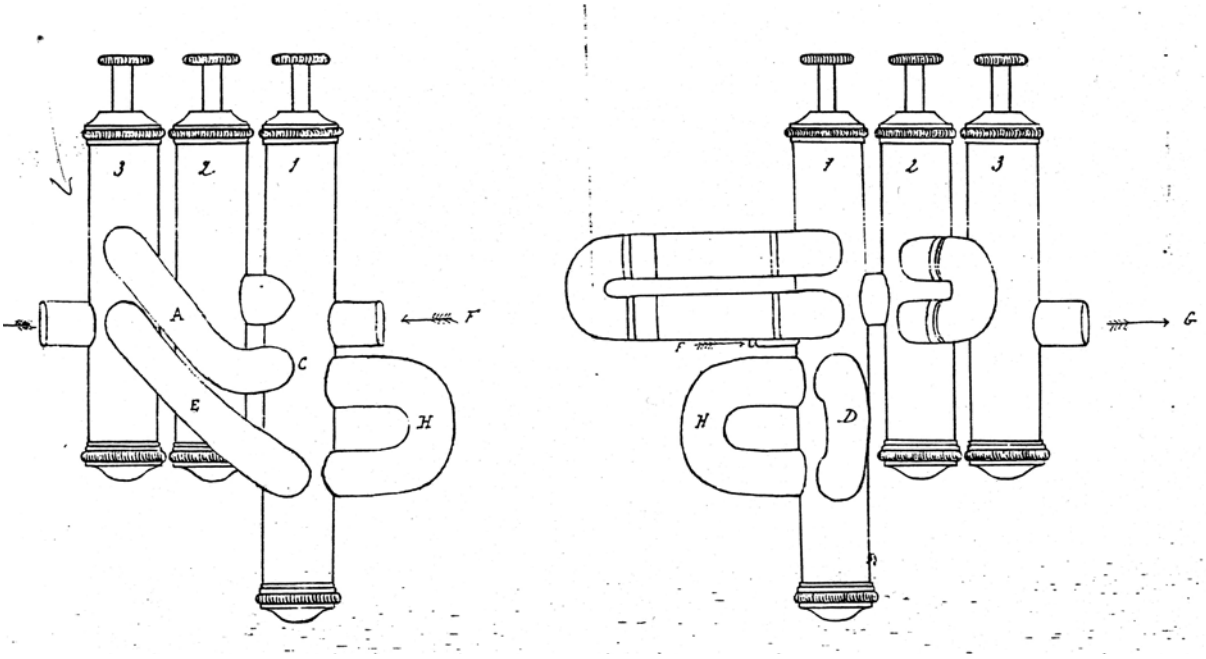


Figure 15. *Drawing from Belgian patent 82.024 of 2 June 1888 showing an extended 1st valve with alternative passages for the 3rd valve loop. A 3rd valve tuning-slide is not shown, but the text of the patent indicates that it can be placed on tube A or tube E as convenient.*

invention in France and in Great Britain.[61] 'Regulating' valves were offered by the Mahillon company on cornets and the range of bugle horns; they are present on some extant cornets and flugelhorns. In 1893, an article in *L'Écho musical* discussed a number of models, including the Goeyens model of trumpet in B♭:[62]

> La trompette en si♭ à pistons régulateurs système Mahillon breveté [...] adoptée par M. Goeyens, l'excellent professeur de trompette [au Conservatoire royal de musique de Bruxelles].
>
> The patented Mahillon system of B♭ trumpets with regulating valves [...] introduced by Mr Goeyens, the excellent trumpet teacher [at the Royal Conservatoire of Music in Brussels].

A Goeyens model trumpet formerly belonging to the Royal Conservatoire of Brussels, dated between 1899 and 1932 (B.B.mim R0026) is on the system of the June 1888 patent (Figure 18, see also colour section).

The Mahillon 'Regulating Valves' thus enjoyed some commercial success while the Mahillon company was in family ownership. The concept of a device applied to just two valves was copied by few other makers.[63] (The intonation problems of valves used in combination are today addressed by the provision of manually-operated mobile valve tuning-slides on small instruments, compensating valves on some of the larger bugle horns such as euphoniums and tubas, and double-principle valves on most orchestral horns.)

SPECIFICITY OF THE CORNET VIS-À-VIS THE TRUMPET

At the 1867 Paris International Exhibition, one of the cornets Mahillon presented was praised by Fétis who took the opportunity to complain about the substitution of the trumpet by the cornet:[64]

[61] French patent 173.828 of 28.01.1886 for 'improvements in brass wind instruments' (*Perfectionnements aux instruments de musique en cuivre*) based on the Belgian patent 71515 of 6 February 1886); French patent 191.034 of 6 June 1888 based on the Belgian patent supplement no. 82024 of 2 June 1888; British patent 295 of 7 January 1886 for 'Cornets and like instruments' based on the original Belgian patent; British patent 3.916 of 13 March 1888, based on the supplement of 2 June 1888.

[62] 'Un Progrès dans la facture instrumentale', *L'Écho musical* (5 November 1893), p.266.

[63] Hawkes & Son's 'Dictor' model euphonium employed compensation when the 3rd and 4th valves were operated together. See Jocelyn Howell and Arnold Myers, 'Hawkes & Son: Instrument Makers', *The Galpin Society Journal* 68 (2015), pp.121–149.

[64] Fétis, *Exposition* 1867, p.530.

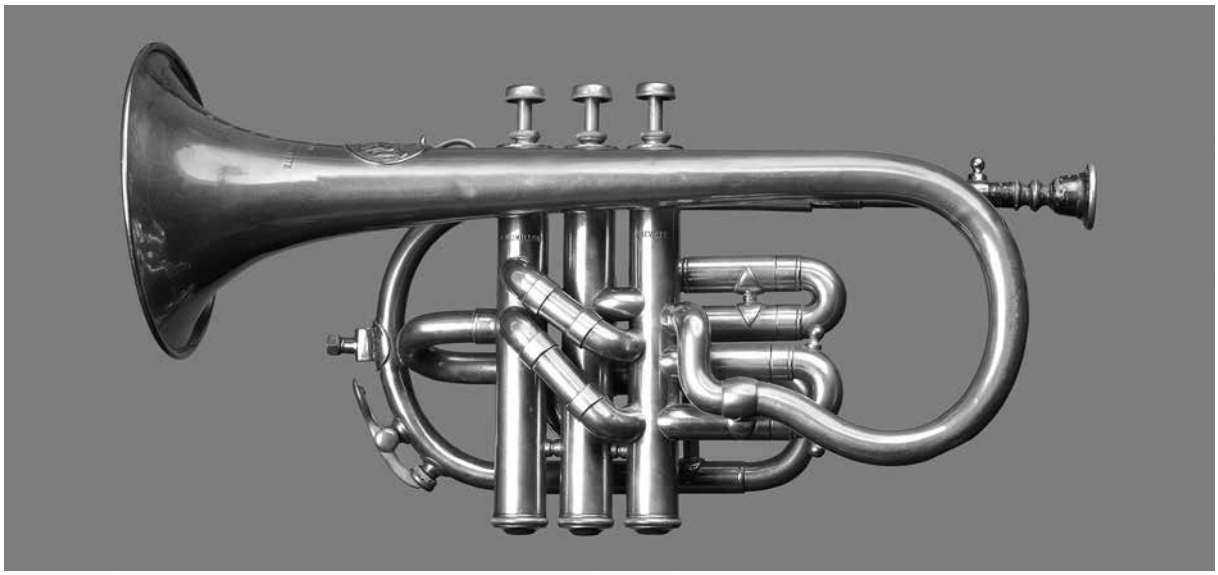


Figure 16. *Cornet in B♭ with double-principle 3rd valve, c1890 (Géry Dumoulin collection 37). Photo: Simon Egan.*

> J'ai plusieurs fois appelé l'attention des facteurs particulièrement à l'Exposition universelle de Paris, en 1855, sur la nécessité de rendre aux cornets leurs proportions normales, et de les rappeler à leur destination primitive. Ces observations ont été comprises par MM. Adolphe Sax et Courtois [...]. Le jury a aussi remarqué deux cornets [...] de M. Labbaye, lesquels ont un joli son, et un bon cornet de M. Mahillon de Bruxelles.
>
> I have repeatedly drawn the attention of makers, especially at the 1855 Paris World Exhibition, to the need to give back the cornets their normal proportions and to remind them of their primary destination. My observations have been understood by MM. Adolphe Sax and Courtois [...]. The jury has also noticed two cornets with a beautiful sound [...] by M. Labbaye and another good cornet by M. Mahillon from Brussels.

Apparently, the Mahillon Company's desire to return to an authentic trumpet timbre developed at the beginning of the 1870s. Among the instruments that belong to the specialties of the house of Mahillon, a soprano trumpet in B♭ is mentioned that aimed to preserve the original trumpet timbre in the orchestra.[65] Such instruments are listed in the commercial catalogues from 1894 onwards:[66]

Referring to V.-Ch. Mahillon's *Éléments d'acoustique musicale et instrumentale* (1874), one can say that 'Mahillon feared – and even witnessed – the extinction of the trumpet in symphony orchestras [and] developed his own simple strategy: making an instrument able to produce a sound close to the tone of the trumpet, but keeping the ease of playing of the cornet'.[67] An instrument corresponding to the original picture in Mahillon's *Éléments d'acoustique* still exists (B.B.mim 1984.031, see Figure 19, see also colour section).

A 'perfected soprano trumpet in B♭' is no. 55 in the 1896 *General Illustrated Catalogue* intended for the British market, and in the commercial catalogues of 1894, 1897, 1899 and 1908. The question is, of course, whether Mahillon's strategy was indeed anti-cornet,

[65] Gustave Lagye, 'Groupe XXXV - Instruments de musique. Exposition de M. M. Mahillon de Bruxelles', in *L'Exposition des arts industriels de Bruxelles 1874*, p.454; B. [Charles Bosselet], 'Arts industriels / Instruments de musique - M. Mahillon', *La Fédération artistique*, 12 February 1875, p.346.

[66] 'Nos trompettes en *si* ♭, par suite des proportions que nous avons données à la colonne d'air, ont le timbre aussi brillant que celui de la trompette en fa. Dans la plupart des grands orchestres où il était d'usage d remplacer la trompette par un cornet à pistons, au détriment de l'effet voulu par le compositeur, on fait emploi aujourd'hui de nos trompettes en *si* ♭.' Mahillon & Co Manufacture Générale d'instruments de musique, *Catalogue général. Première partie* (Brussels: [Mahillon & Co],1894), p.37.

[67] Géry Dumoulin, 'Victor-Charles Mahillon and His Anti-Cornet Strategy', in *Proceedings of the Third Vienna Talk 2015 on Music Acoustics. 'Bridging the Gaps'* (Vienna: Universität für Musik und darstellende Kunst, 2015), p.106.

Figure 17. *Flugelhorn in B♭ with double-principle 3rd valve, c1890 (GB.E.u 4418). Photo: Antonia Reeve.*

or whether it was merely the pragmatic acceptance of the influence of cornet players in symphony orchestras who had become the players of the valve trumpets, while the more conservative 'master' players still used more traditional instruments such as the 'trompette d'harmonie' in France[68] – until their practice became impossible in the pan-chromatic repertoire of composers such as Wagner and Richard Strauss.[69]

Fétis's reaction as a member of the Belgian jury

[68] Edward Tarr quotes the eye-witness testimony of Merri Franquin (1848–934), trumpet professor at the Paris Conservatoire between 1894 and 1925, 'who reminisces that the natural trumpet remained in use at the Paris Opera even until 1861, well into the valve era.' See Edward H. Tarr, 'The Romantic Trumpet', *Historic Brass Society Journal* 5 (1993), pp.213–216, and 6 (1994), pp.110–125, at 5 (1993), p.219.

[69] For a discussion of cornets and trumpets see Arnold Myers, 'How Different are Cornets and Trumpets?', *Historic Brass Society Journal* 24 (2012), pp.113–128.

Figure 18. *Trumpet in B♭ with double-principle 3rd valve, Goeyens model (B.B.mim R0026). (see also colour section)*

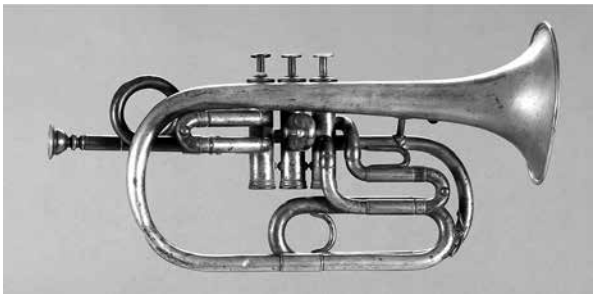


Figure 19. *Trumpet in B♭ (B.B.mim 1984.031). (see also colour section)*

at the 1867 Paris World Exhibition, already partially quoted above, clearly refers to the use of the cornet à pistons in professional orchestras:[70]

> Le cornet à pistons, dont on n'aperçut pas dans l'origine la véritable destination, devait être le *soprano* du cor; tel aurait été en effet son emploi, si les facteurs n'en avaient pas fait une sorte de trompette par ses tubes étroits et par la nature de son embouchure, lesquels produisent des sons tridents. De là vient que dans beaucoup d'orchestres on a remplacé les trompettes par des cornets, plus faciles à jouer, mais dont le son bâtard n'a ni la puissance ni le brillant éclat de l'ancien instrument. Dans l'origine, on voulut faire, du cornet un instrument *sui generis*, destiné à faire briller l'habilité de quelques artistes dans les solos. Plus tard, on en fit l'instrument de la danse; on le prostitua dans les guinguettes et les mauvais lieux. C'est par cette cause que la fabrication des cornets est devenue un des objets les plus important du commerce des facteurs.
>
> The valved cornet, whose genuine destination was not originally understood, was to be the soprano of the horn; such would have been its use, if the makers had not made it a kind of trumpet by its narrow tubes and the nature of its mouthpiece, which produce a strident sound. Hence the replacement of trumpets in many orchestras by cornets, which are easier to play, but whose bastard sound has neither the power nor the brilliance of the ancient instrument. Originally, the cornet was intended to be a *sui generis* instrument, designed to show off the skills of a few artists in solos. Later, it was made into an instrument for dancing; it was prostituted in dance halls and bad places. It is for this reason that the manufacture of cornets has become one of the most important objects in the makers' trade.

Despite these rather mythical considerations about the history of the instrument, Fétis here shares Berlioz's opinion on the difficulty of playing instruments of the keyed bugle and ophicleide type, and supports the 'evolutionary' view of the success of the valve instruments among army and amateur players. Indeed, the first to embrace the new valve technology were precisely these musicians, and it was the professionals in symphony and opera orchestras who were the most reluctant to embrace the technique of valve trumpets and horns.

TRUMPETS AND TROMBONES

At the time when the B♭ trumpet was winning the race for success, especially due to the contribution of virtuoso cornet players who infiltrated symphonic and opera orchestras, the lower pitched instruments in F and G with their solo repertoire and methods fell into disuse.[71] However, retaining all the characteristics of a long trumpet is acoustically impossible with a short trumpet.[72] F trumpets were available in the Mahillon range with different models from the start of the company until World War I. Models with Périnet valves include the 'Orchestral Model' no. 313 and the 'Military model' no. 185 in the 1896 *General Illustrated Catalogue*. The model with rotary valves, no. 20 is equipped with valve touchpieces mounted on the spring drums (*Trommeldruckwerk*) developed by Leopold Uhlmann which can be found on both Austrian and German models.[73] One could therefore say that at the end of the nineteenth century, the Mahillon Company was still producing, or at least had in its

[70] Fétis, *Exposition* 1867, p.530.

[71] Tarr (1993), p.213.

[72] Murray Campbell, Joël Gilbert and Arnold Myers, *The Science of Brass Instruments*. Modern Acoustics and Signal Processing Series. (Cham, Switzerland: Springer Nature, 2021), pp.280–282.

[73] Heyde (1987), pp.27–41.

Figure 20. *Trumpet in B♭, Charlier model, 1925 (Arnold Myers collection). Photo: Antonia Reeve.*

range, Viennese or German examples. The model no. 18 is also labelled as a German model in the price lists of 1873 and 1878: *employée en Allemagne*. Finally, we should mention the F trumpet made by Barthélemi Mahillon *c*1830 (B.B.mim 1307) (see above). It has double piston valves with an *altmainzer Druckwerk*, i.e. double piston valves actuated by hinged touchpieces and leaf springs with rollers.[74] The model no. 20 resembles in detail the trumpet model of Uhlmann from 1840 which Herbert Heyde describes as a typical Viennese model.[75]

A B♭ trumpet with Périnet valves, made by the Mahillon company and endorsed by Théo Charlier (1868–1944), was quite successful in the first half of the twentieth century. Charlier, the influential trumpet professor at the Liège Conservatoire (1901–1933), gave his name to a trumpet with a design influenced by the German trumpets with rotary valves,[76] but with a relatively narrow bore and a rather high brassiness potential.[77] This model (no. 312) was also fitted with an adjustable first valve slide, see Figure 20.

Most B♭ trumpets with Périnet valves have a so-called '*perce pleine*' or valve passage with the same diameter as the inner bore (see above). 'Perce pleine' is mentioned in the 1867 *Catalogue explicatif* and in the subsequent price lists and commercial catalogues of the Mahillon Company. In the first case this characteristic refers to all instruments, in the second case only to those instruments which are not preceded by a +.[78] The ratio there is usually 50:50. High D, E♭ and piccolo B♭ trumpets are discussed below.

As already mentioned, the term '*perce pleine*' refers to an innovation introduced by Besson in 1855, thus not to V.-Ch. Mahillon's 1880 patent for a *système de pistons doubles à perce absolument pleine et régulière* (a system of double valve with a regular and full bore diameter). Latterly, Mahillon only used double piston valves on trombones. The Mahillon Company produced trombones in three sizes: alto, tenor and bass[79] but no tenor-bass trombones with a thumb valve. The 'tenor-bass' trombones nos. 22 and 80 are hybrid instruments: they have the same compass as a tenor, but they have the wider bore of the bass:[80]

[74] Heyde (1987), p.57.

[75] Heyde (1987), p.148.

[76] Rosario Macaluso, 'Le cours de trompette au Conservatoire royal de musique de Liège depuis 1826', *Bulletin de la Société liégeoise de Musicologie* 79 (October 1992), p.14.

[77] The bore is 9.85mm at the valves and 10.0mm at the tuning-slide, and the brassiness potential is 0.75, rather high for a twentieth-century trumpet.

[78] 'Les instruments dont le numéro est précédé d'une + ont les pistons et l'embouchure en cuivre. Tous les autres instruments ont les pistons en argentine et la perce pleine.' See *Manufacture générale d'instruments de musique Mahillon & C°* (Brussels: [Mahillon & Co], 1911), p.35.

[79] A contrabass trombone in B♭ with four valves was available in the instruments for Wagner's *Ring* (see below). The few remaining large trombones are in F.

[80] Mahillon & Co Manufacture Générale d'instruments de musique, *Catalogue général. Première partie* (Brussels: [Mahillon & Co], 1894), p.41.

> Le trombone basse en *si*♭ est en unisson avec le trombone ténor, mais ses proportions très larges en font un instrument basse et permettent de donner en pleine sonorité, les notes extrêmes du registre grave, qui manquent d'ampleur sur le trombone ténor.
>
> The B♭ bass trombone is in unison with the tenor trombone, but it's very wide proportions make it a bass instrument and allow it to give full sonority to the lowest notes, which lack fullness on the tenor trombone.

All the various valve systems are represented: Périnet type valves, double piston valves, rotary valves, compensating valves patented by V.-Ch. Mahillon, and independent valves, patented by Adolphe Sax. For all pitches, a model with a slide is available. However, the full range of sizes was only available in the 1894 *Catalogue général* – the models nos. 21 and 111. Finally, there was one model, no. 280, which combines valves and slide, but available only in the tenor register. In the price lists from 1873 to 1879 there are also instruments with four valves. On Belgian instruments the fourth valve usually descends a tritone.[81] These different models may indicate different sources of inspiration. At least one model is derived from a foreign example: no. 75 corresponds in detail to the *Armeeposaune* model that the Bohemian maker V. F. Červený had developed for the Austrian army in 1867.[82]

In 1872, V.-Ch. Mahillon introduced a three-valved trombone with the bell tube and the main tube forming a right angle, often termed a 'cavalry trombone'. Such a design was not new since Adolphe Sax had already used it for his instruments with six valves, mainly commercialised in the 1870s. A trombone with four valves and tubes at a right angle was already shown on the publicity leaflet published by Adolphe Sax on the occasion of the Paris World Exhibition of 1867.[83] According to Mahillon:[84]

> Ce n'est pas que des trombones nouveaux n'aient été faits déjà pour supprimer l'ancienne forme; mais ces instruments, en compliquant les contours, ne respectaient pas toujours le timbre de l'instrument par les angles, les rétrécissements de perce auxquels ces configurations donnaient lieu. Le trombone en question n'offre pas ce sérieux inconvénient: la simplicité du contour est strictement observée, nous avons supprimé les défauts en conservant et en augmentant les avantages. La partie inférieure se pose naturellement sous le bras gauche qui le soutient, la main gauche est entièrement libre pour la direction de l'embouchure et la main droite ne pourrait trouver de meilleure position pour l'emploi des pistons que celle qui lui est assignée.
>
> Recently, trombones have been made that replace the traditional design; but these instruments, by complicating the outline of the bore, did not always respect the timbre of the instrument because of presence of angles and of the narrowing of the bore to which these configurations gave rise. The trombone in this case does not have this serious disadvantage: the outline of the bore is strictly observed, and we have eliminated the shortcomings while preserving and increasing the benefits. The lower part of the instrument rests naturally under the left arm which supports it, the left hand is entirely free to direct the mouthpiece and the right hand could not find a better position for the use of the pistons than the one assigned to it.

It is perhaps no coincidence that especially the firm of Lebrun in Brussels built trombones with six (sometimes seven) valves at the end of the nineteenth century and the beginning of the twentieth. The chief valve maker in the Mahillon company *c*1870 was Michel Lebrun (see below). On the other hand, the Séha model no. 441 with six independent valves and with right-angled tubing, is entirely a copy of Adolphe Sax's trombone with six independent valves. This is acknowledged in an article in *L'Écho musical*, in which a number of models by the Mahillon firm are recommended. In the 1899 *Algemeenen catalogus*, the model no. 23 with double-piston valves is also referred to as a Séha model. However, it is just as unoriginal a Séha as the Sax model. In such

[81] 'En Belgique les facteurs ont l'habitude d'accorder le 4e piston un demi-ton plus bas, donc au *fa*# (c'est à dire trois tons au-dessous du diapason principal).' See Fr.-A. Gevaert, *Nouveau traité d'instrumentation* (Paris-Brussels : Lemoine & Fils, 1885), p.271 (footnote 1). Gevaert considered both trumpets and trombones.

[82] See the model no. 75 in the 1894 *Catalogue general*, p.41, and compare with the V.F. Červený model in Heyde (1987), p.282.

[83] A valve trombone in this wrap is known as 'cavalry trombone', for an example see GB.E.u 3199. The only extant instruments date from the period 1870–1876. See Haine and De Keyser (1980), pp.169–176 and pp.245–246.

[84] V. C. M. [Victor-Charles Mahillon], Nouveau modèle de trombone ténor, *L'Écho musical* (20 August 1872), pp.[ii]–[iii].

cases one wonders whether the addition of the name of a Conservatoire teacher to a type of instrument is nothing more than a commercial ploy to appeal to customers by suggesting endorsement.

It is worth noting that the trombones, unlike the trumpets for example, do not distinguish between band and orchestral pitches. Alto trombones were offered only in E♭, tenor instruments only in B♭ and bass instruments in F and G. A bass trombone in F corresponds to the *Quart Bassposaune* and the bass trombone in G was mainly used in the United Kingdom. There were also bass trombones in E♭, but they required great effort on the part of the player and were seldom used.[85]

NATURAL AND VALVE HORNS

Some conservative tendencies in nineteenth-century horn playing can be explained by the different socio-cultural strata in which specific types of horn evolved. This is particularly the case for the maintenance of the horn's hand-stopped sound or the aversion to the use of valve mechanisms. The instrument that emerged at the end of the eighteenth century was a horn with an extremely wide compass, to which the use of hand-stopping was increasingly applied, in combination with crooks inserted in the middle of the bore circuit in order to change the tonalities into G, F, E, E♭ and D. This kind of instrument is known as an *Inventionshorn*. The hand-stopping technique was brought to perfection and attested in treatises of virtuosos and teachers such as those of Frédéric Duvernoy (1802), Louis-François Dauprat (1824) and Jean-Baptiste Mengal (1835). This technique was used, even after the introduction of valves around 1815, by professional soloists and orchestral musicians.

In France, the *cor solo* was clearly an instrument of professionals, exemplified by the superb horns produced by the Raoux firm and awarded to the students obtaining the 1st Prize at the Paris Conservatoire.[86] It is also in the perspective of a persistence of hand-stopping techniques by professional horn players that one must understand the discussion as late as 1881 between the horn professor of the Brussels Conservatoire, Henri Merck (1831–1900), and V.-Ch. Mahillon.[87] Merck defended the use of hand-stopping in a reply to two criticisms published in *L'Écho musical* after the Conservatoire competitions, in 1877 and 1881 respectively:[88]

> Dans votre compte-rendu des concours du Conservatoire en date du 30 juin 1881 […], vous me reprochez d'avoir fait abus des sons bouchés. Déjà en 1877, vous avez […] parlé dans le même sens […] ; mais cette fois je suis tenté de croire à un parti pris de votre part. […]
>
> Depuis l'adaptation des *pistons*, il semblerait que le cor dût se jouer comme le trombone ou le piston, ce qui serait vouloir en détruire absolument le caractère tendre et sympathique, et par là le rendre semblable à tous les autres instruments de cuivre […]. Autant pour la qualité du son que pour la justesse, l'emploi de la main dans le pavillon est d'un grand secours.
>
> Les tubes de l'instrument ne sont jamais proportionnés suffisamment que pour garantir une justesse irréprochable. Depuis nombres d'années je me fais entendre comme virtuose et je ne n'ai jamais reçu aucune critique ni pour la qualité du son, ni pour la justesse, et pourtant, je me sers de la mains dans le pavillon, dans ces deux cas […].
>
> Il en est de même pour les *enharmoniques* qui ne peuvent s'obtenir d'une manière satisfaisante avec les pistons seuls ; et c'est précisément ce détail qui donne au cor un caractère tout spécial.

> In your report on the Conservatoire exams of 30 June 1881 [...], you reproach me for having abused hand-stopped sounds. Already in 1877, you [...] spoke in the same vein [...]; but this time I am tempted to believe that you are biased. [...]
>
> Since the adoption of valves, it would seem that the horn should be played like the trombone or the cornet, which would mean destroying its tender and sympathetic character, and thus making it similar to all other brass instruments [...]. The use of the hand in the bell is of great help, both for the quality of the sound and for its accuracy.
>
> The tubes of the instrument are never sufficiently

[85] Gevaert (1885), pp.243–246.

[86] Anneke Scott, John Chick, and Arnold Myers, 'The Cor Solo: History and Characteristics', *Historic Brass Society Journal* 31 (2019), pp.1–34, at pp.12–14. This study concludes that there has been an evolution of horn making over time, but states that there is no acoustic difference in solo and orchestral horns manufactured by the same makers.

[87] The present authors would like to thank Florence Bellière for providing the unpublished text of her lecture on the dispute between Merck and Mahillon, presented at the Historic Brass Society Conference in New York in July 2012.

[88] [Victor-Charles Mahillon], A propos de cor, *L'Écho musical* (14 July 1881), p.159.

> proportioned to guarantee perfect pitch. For many years I have been a virtuoso and have never received any criticism either for the quality of the sound or for the accuracy, and yet I use hand-stopping in the bell in both cases [...].
>
> The same applies to enharmonics, which cannot be obtained satisfactorily with the valves alone; and it is precisely this detail that gives the horn its special character.

In his reply, V.-Ch. Mahillon first quotes the criticism published in 1877 by his brother Ferdinand-Charles, then blames Merck in turn for sacrificing sound accuracy:[89]

> Pourquoi ses élèves se servent-ils des sons bouchés avec des cors chromatiques? L'emploi alternatif de ces sons avec des sons ouverts est d'un effet très désagréable, supportable par nécessité pour les cors simples, mais absolument inadmissible pour le cor chromatique [...]. Nous ne parlons pas des effets d'écho, bien entendu, où toute la phrase est répétée en sons bouchés; cet effet, au contraire, est charmant et constitue l'une des beautés du cor [...].
>
> Quant à la question des enharmonies, elle ouvre un vaste champ à l'étude. Mais nous croyons prudent de ne pas l'entamer à propos de cor. Nous frémissons à l'idée de voir tous les instruments à vent d'un orchestre s'écarter de la modeste voie du tempérament pour faire l'école buissonnière dans les jardins trop fleuris de l'enharmonie. Grand Dieu! que deviendraient nos oreilles si tous les tubes sonores résonnaient dans nos orchestres avec l'assurance et la justesse du cor!
>
> Why do his students use hand-stopping on chromatic horns? The alternating use of these sounds with open sounds is a very unpleasant effect, bearable by necessity for the simple horns, but absolutely inadmissible for the chromatic horn [...]. We are not talking about echo effects, of course, where the whole phrase is repeated with hand-stopping technique; this effect, on the contrary, is charming and constitutes one of the beauties of the horn [...].
>
> As for the question of enharmonics, it opens up a vast field for study. But we think it prudent not to start on the horn. We tremble at the thought of seeing all the wind instruments in an orchestra deviate from the modest path of temperament to play truant in the overly flowery gardens of enharmony. What would become of our ears if all the sonorous pipes in our orchestras resounded with the assurance and accuracy of the horn!

Apparently, the polemic between Merck and V.-Ch. Mahillon was a dialogue of the deaf. Merck defends the use of hand-stopping by professionals in order to modulate the timbre of the horn, to adjust the intonation and to give the sound the greatest brilliance or contrasting colours. This practice is still in use today.[90] Victor-Charles Mahillon takes the point of view of the acoustician and wind instrument maker who imagines an equal temperament and designs valve mechanisms that can be perfectly adapted to it.

In professional circles in the nineteenth century, the horn became the object of competition between different national or even regional schools seeking to highlight its lyrical character – as opposed to the archetypal connotations of a hunting instrument.[91] The heyday of the *cor solo* coincided with the bel canto style of Italian opera composers such as Gioacchini Rossini, Gaetano Donizetti and Vincenzo Bellini, and in the performances of Giovanni Puzzi (1792–1876), one of the greatest *cor solo* virtuosos of the nineteenth century.[92] In Belgium, the genesis of the lyrical style of horn players can be linked to teachers and composers such as Martin-Joseph Mengal (1784–1851),[93] Jean-Désiré Artôt (1803–1887), Toussaint Radoux (1825–1889), Adolphe Samuel

[89] The first paragraph is taken from Ferdinand-Charles's 1877 critique, the second from Victor-Charles Mahillon's 1881 reply. *Ibidem*, pp.159–160.

[90] The eminent principal horn player at the Théâtre Royal de la Monnaie in Brussels, Jean-Pierre Dassonville, horn teacher at the Royal Conservatory of Music in Brussels, advises his students to practice the *cor solo* in order to learn how to use hand-stopped sounds, which he himself masters marvellously on period instruments in a repertoire of the end of the eighteenth and beginning of the nineteenth centuries.

[91] Elisabeth Bradley Strauchen-Scherer, 'Technology and Timbre: Features of the Changing Instrumental Soundscape of the Long Nineteenth Century (1789–1914)', *The Oxford Handbook of Timbre*, online publication available at <https://www.oxfordhandbooks.com/view/10.1093/oxfordhb/9780190637224.001.0001/oxfordhb-9780190637224-e-24>.

[92] Elizabeth Bradley Strauchen, 'Giovanni Puzzi: His Life and Work: A View of Horn Playing and Musical Life in England from 1817 into the Victorian Era (c.1855)', DPhil, University of Oxford, 2000.

[93] His brother was the horn player at the Théâtre des Italiens in Paris, Jean-Baptiste Mengal (1792–1878), also born in Ghent, whose *Méthode de cor* (*c*1835) has already been mentioned.

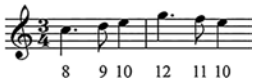
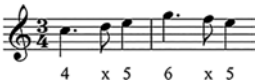
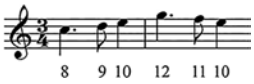
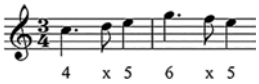
(1824–1898) and Henri Merck himself.[94]

The Mahillon Company produced only one *Inventionshorn* model, which is called 'Hand Horn – Artist's model' in the 1896 *General Illustrated Catalogue* – where it is presented with detachable valves. Apparently, the Belgian protagonists of the lyrical style turned instead to the horns produced by Mahillon's competitor, the Brussels firm of Van Cauwelaert.[95] It should be remembered that the valve systems on the horn evolved from the early model with two rotary valves[96] and indeed the instruments with two valves were preferred by soloists. The production of instruments for military and civilian bands and orchestras was limited to instruments with three valves. It is therefore remarkable that the 'Henri Merck' horn model is a three-valved instrument. This model was only introduced into the Mahillon Company's range in 1893, 12 years after the controversy between Henri Merck and V.-Ch. Mahillon:[97]

> Les cors à 3 pistons, du modèle récemment crée par la firme Mahillon aidée des précieux conseils de M. Merck, professeur au Conservatoire royal de musique de Bruxelles.
>
> The horns with three valves, of the model recently created by the Mahillon firm with the precious advice of Mr. Merck, professor at the Royal Conservatoire of Music in Brussels.

Models with three valves were in the majority in the range of Mahillon horns: the model no 25 alone has only two valves. Mahillon also produced a 'double' horn, i.e. with a transposing valve. This was no. 340 in their production range, represented in the sales catalogues of 1908, 1913 and 1914 and which had a device patented by the Mahillon Company in 1907 (Belgian Patent 199.750).

Surprisingly, although instruments with three valves were for amateurs, it seems that even these instruments had inconveniences for amateur or inexperienced musicians. Mahillon also produced an alto horn, no. 28, and a tenor horn, no. 122. In the 1899 *Algemeenen Catalogus*, the latter is also mentioned as a *'Liefhebbers Hoorn'* or 'Pseudo Hoorn'. Although it has a horn-like bore, this variant has half the tube length of the french horn. This is how V.-Ch. Mahillon explains it in the revised version of his *Éléments d'acoustique*:[98]

> Dans le passage  exécuté par le cor, tous les sons appartiennent à l'octave aigüe de l'échelle harmonique, tandis que, exécuté par le cor alto dans le même passage  tous les sons appartiennent à l'octave moyenne; la longueur théorique du cor étant exactement double de celle du cor alto, l'unisson entre les sons des deux instruments est établi et l'effet réel est semblable à part une faible différence de timbre. Nous marquons d'un « x » les sons produits sur le cor alto en mi♭ par le premier piston; ces mêmes sons, *ré*, *fa*, peuvent se produire sur le cor à pistons par l'emploi du premier piston ou par les harmoniques 9, 11 de l'instrument naturel.
>
> In the passage  performed by the horn, all the sounds belong to the high octave of the harmonic scale, whereas, performed by the alto horn in the same passage  , all the sounds belong to the middle octave; the theoretical length of the horn being exactly double that of the alto horn, the unison between the sounds of the two instruments is established and the real effect is similar apart from a slight difference in

[94] Jeroen Billiet, *Brave Belgians of the Belle Epoque. A Study of the Late-Romantic Ghent Horn Playing Tradition*, [Doctoral Research Project Ghent University], ([Termonde]: Golden River Music, 2021), pp.85–128, at pp.89–93. The 'lyrical style' tradition in the Palmarès of the Ghent Conservatory includes some 30 compositions written between *c*1820 and 1960 [*Ibidem*, pp.129–210].

[95] Billiet (2021), pp.211–283.

[96] Heyde (1987), p.109.

[97] Un Progrès dans la facture instrumentale, p.266.

[98] Victor-Charles Mahillon, *Éléments d'acoustique musicale et instrumentale comprenant l'examen de la construction théorique de tous les instruments de musique en usage dans l'orchestration moderne* (posthumous publication by Daniel Bariaux of Mahillon's manuscript revision and additions, completed 27 February 1916 in Saint-Jean-Cap-Ferrat), (Brussels: Les Amis de la Musique, 1984), pp.205–206.

> timbre. We mark with an 'x' the sounds produced on the alto horn in E♭ by the first piston; these same sounds, D, F, can be produced on the French horn by the use of the first piston or by the 9th and 11th harmonics of the natural instrument.

The description of the 'Tenor Cor' in the 1896 *General Illustrated Catalogue* presumably by V.-Ch. Mahillon, refers to the tenor saxhorn and the Koenighorn, two instruments which resemble it because of their medium-wide conical bore. The Koenighorn was produced by Antoine Courtois in Paris from 1855; the alto or tenor horn ('cor') was introduced by Besson in Paris in the 1860s. V.-Ch. Mahillon first mentioned an alto horn in *L'Écho musical* in 1875. There is also an illustration of an alto horn which shows an instrument which, apart from a few details, corresponds to the 'pseudo-hoorn' (Dutch) and the tenor horn in the catalogues of 1896 and 1899. The alto horn has, like the tenor horn, the bell tube to the right of the valves which are therefore played with the right hand. The bell of the alto horn does not seem to be as wide as that of the 'pseudo-hoorn' and its construction is reinforced by additional dummy tubes. Another alternative to the horn with piston valves is the 'tenorino' in C, introduced by the Mahillon Company in 1881:[99]

> Ce nouvel instrument d'amateur d'une sonorité douce et d'une exécution facile, est destiné à jouer sans transposition toute musique écrite pour voix avec accompagnement de piano.
>
> This new amateur instrument has a soft sound and is easy to play. It is designed to play all music written for voice with piano accompaniment without transposition.

This description corresponds to instruments such as the 'Vocal Horn' (made by Rudall, Rose & Carte from 1862 to 1928), and the 'Ballad Horn' produced by Boosey in London from 1869 to 1928.[100] We can therefore conclude that the various alternative horn models such as Mahillon's ballad horn, tenor cor, etc., which were essentially saxhorns in the shape of a horn, offered an alternative to the piston horns used in ensembles of amateur and/or military musicians. They allowed easier access to playing and provided an instrument that was a little more 'lyrical' than the hunting horn.

MAHILLON'S 'BACH' TRUMPET

At the end of 1871, in a controversy on the use of the natural trumpet for the performance of *clarino* parts in works of Bach and Handel, V.-Ch. Mahillon disputed with music critic Otto Lessmann. This polemic has been quoted in full by William Blandford (1935),[101] and more briefly by Philip Bate (1972).[102] The argument concerned a report by Lessmann on the presentation of a 4-ft straight conical brass instrument in the Berlin *Tonkünstler-verein* where it was played by royal *Kammer Musicus* Julius Kosleck (1825–1905)[103] who produced a diatonic series on it. According to Lessmann the instrument was pitched in B♭ and was lowered by a straight tube to a D instrument, i.e. an instrument in Baroque pitch, that, according to Lessmann, no longer existed.[104] V.-Ch. Mahillon reacted in *L'Écho musical* to this report, saying that a 4-ft instrument is unable to produce a diatonic series. On a sarcastic tone he added that such a series, if not diatonic, might perhaps have been an Indian mode, for this is what a lip vibrated instrument produces when sounding the 8th, 9th, 10th and further harmonics.[105]

[99] 'Tenorino in C, 120 Fr.', *L'Écho musical* (3 November 1881), advertisement page, not numbered.

[100] Arnold Myers, 'The "Concert" or "Vocal" Horn', *The Galpin Society Journal* 69 (2016), pp.168–180.

[101] W. F. H. Blandford, The 'Bach Trumpet', *The Monthly Musical Record* LXV (1935), (I) no. 765, pp.49–51, (II) no. 766, pp.73–76, and (III) no. 767, pp.97–100.

[102] Philip Bate, *The Trumpet and the Trombone. An Outline of their History, Development and Construction* (London: W. W. Norton and Company, 1978), pp.191–192.

[103] With regard to Kosleck see also Edward H. Tarr, 'The "Bach trumpet" in the nineteenth and twentieth centuries,' in *Music of the past – instruments and imagination*. Proceedings of the *harmoniques* International Congress (Lausanne, 2004), Publikationen der Schweizerischen Musikforschenden Gesellschaft, II/46 (Bern: Peter Lang, 2006), pp.26–29; and John Wallace and Alexander McGratten, 'Chapter 10 the 'Bach revival' 'Bach' trumpets, and the advent of the piccolo trumpet in *The Trumpet* (New Haven and London: Yale University Press, 2012), pp.225–241.

[104] Otto Lessmann, 'Feuilleton. Ein interessantes Instrument', *Neue Berliner Musikzeitung*, 25 October 1871, pp.341–342.

[105] 'Le charme de cette succession ne pourrait être apprécié comme gamme, que par un adorateur de Brahma, car elle détermine exactement, à part le *si b*, un mode consacré à l'un des fils de cette divinité des Hindous.' See V.C.M. [Victor-Charles Mahillon], 'Une découverte intéressante', *L'Écho musical* (15 November 1871), pp.[ii]–[iii].

In a letter to the editor of *L'Écho musical*,[106] Lessmann in turn answered that a (second) cylindrical slide allowed Kosleck to play the second octave and even the first tetrachord of the third octave and to make trills. V.-Ch. Mahillon's further reaction is remarkable: he deemed certain parts, scored for trumpets by Bach and Handel, as 'impossible to perform', and wondered whether Bach and Handel knew how to write for a trumpet, if their scores had ever been properly performed, or if these composers had at their disposal such a great virtuoso as Kosleck.[107] V.-Ch. Mahillon further states that a straight trumpet has no acoustical advantages compared to a curved model, and then rightly concluded that neither the straight trumpet, nor the cornet, but the genuine trumpet of Bach's time had to be reestablished. Clearly, in 1871, at the time of this polemic, V.-Ch. Mahillon was not (yet) acquainted with the technique of *clarino* playing and, although he did foresee the possibility that Bach's and Handel's *clarino* parts could have been played by an accomplished virtuoso, he evidently did not know about the excellent trumpet players in Bach's circle, such as Johann Gottfried Reiche (1667–1734).

More than 20 years later, in 1893, V.-Ch. Mahillon included a detailed description of the *clarino* playing, and a comprehensive history of the Baroque trumpet, in the second edition of the first volume of the *Catalogue [...] du Musée Instrumental*.[108] During that intervening period, V.-Ch. Mahillon experienced a slow but steady evolution in his perception of the 'systemic' nature of ancient musical instruments, i.e. their specific construction properties and playing techniques. A first step in V.-Ch. Mahillon's changing attitude towards the Baroque trumpet and the *clarino* playing technique can be found in the paragraph on the trumpet in his 1874 edition of his *Éléments d'acoustique*. In his treatise, he considers the trumpet in D being more suitable to play up to the twelfth natural note, although he implicitly admits this capacity to be insufficient to perform the works of Bach and Handel.[109] About the time of the publication of his *Éléments d'acoustique*, the Mahillon manufactory is credited with making a soprano trumpet in D for the performance of the works of Handel and Bach (*Trompette soprano en ré, construite pour l'interprétation des œuvres de Händel et de musique de Bach*) and an *oboe d'amore* made for the same purpose (*pour l'interprétation fidèle de la musique de Bach*); according to an article in *La Fédération artistique* (1875).[110] These instruments were presented as 'special musical instruments, introduced by the Mahillon Company in Belgium' and they were intended for the Bach performances in the Brussels Conservatoire conducted by the newly appointed director, François-Auguste Gevaert, a Belgian composer and choirmaster of the Paris Opera who had fled France after the Paris Commune.[111] The

[106] Published as 'Réponse à la rédaction de *L'Écho musical* de Bruxelles' in V.C.M. [= Victor-Charles Mahillon], 'Une intéressante découverte (suite)', *L'Écho musical* (15 January 1872), pp.[ii]–[iv].

[107] 'Est-on bien sûr […] que Bach et Handel connaissaient bien la trompette, est-on bien certain qu'on ait jamais exécuté leurs partitions telles qu'ils les ont écrites […]? Il se peut aussi que les maitres dont les partitions contiennent ces passages aient connu de leur temps un autre M. Kosleck, car ce qui est peut avoir été.' See Victor Mahillon's comment on Lessmann's new letter in V.C.M., 'Une intéressante découverte (suite)', *L'Écho musical* (15 January 1872), p.[iii].

[108] Victor-Charles Mahillon, *Catalogue descriptif et analytique du Musée instrumental du Conservatoire royal de musique de Bruxelles* (Ghent: Ad. Hoste,1893), vol.1, pp.273–292; also Victor-Charles Mahillon, *Éléments d'acoustique musicale et instrumentale comprenant l'examen de la construction théorique de tous les instruments de musique en usage dans l'orchestre moderne* (Brussels: C. Mahillon, 1874), pp.161–166.

[109] 'Avec le ton de ré, on prend facilement l'harmonique 12, et si l'on consulte les partitions de Handel et de Bach, on y trouve la trompette en ré employée, jusqu'au seizième harmonique.' See Victor-Charles Mahillon, *Éléments d'acoustique musicale et instrumentale comprenant l'examen de la construction théorique de tous les instruments de musique en usage dans l'orchestre moderne* (Brussels: C. Mahillon, 1874), pp.106–107.

[110] Lagye (1874), p.454; Bosselet (1875), p.346.

[111] 'M. Plétinckx, professeur du Conservatoire de Bruxelles, a obtenu un véritable succès dans cette partie du programme, par le brillant parti qu'il a su tirer de cet instrument [le hautbois d'amour] qui, délaissé à tort, depuis la mort de l'illustre compositeur Bach, tend à reconquérir la vogue, grâce à la Maison Mahillon, à qui revient, on peut le dire, la résurrection de ce charmant instrument.' (M. Plétinckx, professor at the Brussels Conservatory, obtained a real success in this part of the program, by the brilliant way in which he took advantage of this instrument ['le hautbois d'amour']. Wrongly abandoned since the death of the great composer Bach, [the oboe d'amore] is now regaining public attention, thanks to efforts of the House of Mahillon, to which the resurrection, so to speak, of this charming instrument is due). See C. F. [Ferdinand Charles Mahillon ?], 'Causerie', *L'Écho musical* (29 November 1874), p.[ii].

oboe d'amore made by the Mahillon manufactory was used in the concerts of the Conservatoire.[112] However, there is not a single mention before 1890 of the use of a trumpet in D made by the Mahillon Company for the performance of Bach's music.

A '*Note historique*' published by F. Hernardin in H. Duhem's *24 Études mélodiques 3me recueil (Œuvres Posthumes) pour cornet à pistons, bugle ou trompette soprano en Si♭ suivies de 20 études pour trompette aiguë en Ré (Petite)* (Brussels: Charles Walpot, 1925) tells us that Hippolyte Duhem, the cornet and trumpet teacher of the Brussels Conservatoire (Figure 21), between 1860 and 1888 used a trumpet in D, made for him by the Paris maker Courtois. The late Reine Dahlqvist was the first to draw attention to this text in his 1988 thesis on the history of the trumpet (in Swedish),[113] and in an article derived from his thesis in the 1995 *EURO-ITG Newsletter* quoted by all scholars who have written on the subject.[114]

Figure 21. *Hippolyte-Jean Duhem (1828–1911). Register of the staff members at the Brussels Conservatoire. Courtesy of the Conservatoire Royal de Musique de Bruxelles.*

The text reads as follows:

> During a stay in Paris in 1861, M. H. Duhem, had a high-pitched trumpet in D built by the famous musical instrument maker Antoine Courtois. [M. Duhem], professor of trumpet and valve cornett at the Brussels Royal Conservatoire of Music [and] the author of this work, [furnished himself] the data [to the maker]. This new instrument, while still possessing the characteristic timbre of the trumpet, had the necessary qualities to fulfil the function for which it had been created and which, following a brilliant demonstration by the eminent artist H. Duhem, was commissioned by M. Fétis to perform the works of the immortal masters Handel and Bach at the Brussels Conservatoire. The little trumpet is still in use in this institution.

A critical reading of this source reveals several of its weaknesses:

1. F. Hernardin was a Brussels woodwind instrument maker from whom only a double recorder (*Flûte d'accord*) is known to exist.[115] He is not known to have been an expert on brasswind instruments.

2. The third volume (*3me Recueil*) of Duhem's *Etudes* in which the text is quoted is a posthumous publication, dated 1925. Therefore, the information in this 'historical note' relates to an almost 65-year-old event, which is recorded here for the first time and is not mentioned anywhere else.

3. In his 1890 work on the International Exhibition of a year before, Constant Pierre wrote about Besson producing an 'oratorio' trumpet in G for performances given during the bicentennial of

[112] 'Cet instrument [le hautbois d'amour] a été tiré de l'oubli par M. Gevaert, directeur du Conservatoire, qui e a confié la reconstruction à M. Mahillon.' (This instrument [the oboe d'amore] has been brought out of oblivion by M. Gevaert, Director of the Conservatory, who has entrusted its reconstruction to the care of M. Mahillon). See Ch. B. [Charles Bosselet], 'Causerie', *L'Écho musical* (20 April 1874), p.[i]. See also Stefaan Verdegem, 'Fétis, Gevaert, Mahillon and the Oboe d'Amore', *The Galpin Society Journal* 48 (2015), pp.87–88 and 106–107.

[113] Reine Dahlqvist, 'Bidrag till trumpeten och trumpetspelets historia. Från 1500-talet till mitten av 1800-talet. Med särskild hänsyn till perioden 1740–1830', Disputationsupplaga, University of Gothenburg, 1988.

[114] See Reine Dahlqvist and Bengt Eklund, 'The Bach Renaissance and the Trumpet', *Euro-ITG Newsletter* 1 (1995), p.15.

[115] William Waterhouse, *The New Langwill Index. A Dictionary of Musical Wind-Instruments Makers and Inventors* (London: Tony Bingham, 1993), p.172.

Bach's birth in 1885,[116] and of Teste, an opera trumpeter, who had ordered it.[117] Pierre does not mention that Courtois, to whom he refers in half a dozen of quotations, would have made a trumpet in D for the same purpose, almost 25 years earlier. Additionally, not a single trace remains of this trumpet in high D made by Courtois for Duhem.

As an introduction to the Duhem's 20 *Études* for the high pitched trumpet in D, this 'historical note' must be considered as an honorary tribute to the author of these studies, and/or as a commercial argument, rather than as unbiased historical account. That Hippolyte Duhem was an extraordinary cornet and trumpet player is beyond dispute, and no doubt Fétis rated him highly. And perhaps he did indeed play a high pitched cornet (in high E♭ with a crook for D?) or a trumpet made by Courtois in his performances of works of Bach and Handel.

In the Spring of 1872, 1873 and 1874, Gevaert performed Handel's *Dettingen Te Deum* (HWV 283) and his first coronation anthem *Zadok the Priest* (HWV 258) at the Conservatoire concerts; these works require three trumpets, including a *clarino* part for a skilled player. For that production François Pletinckx, the oboe teacher at the Brussels Conservatoire, and his former student, Frédéric Sennewald, played the *oboe d'amore* that the Mahillon Company had made.[118]

The titular cornet/trumpet teacher at the Conservatory, Duhem, should normally have played these *clarino* parts, and the 'Bach' trumpets made by the Mahillon Company were already available. However, the Mahillon 'Bach' trumpets were not used for these concerts, since they are not mentioned again, nor documented, before 1888. Duhem became ill in the course of 1888. Since he was no longer able to perform his duties, he was given leave of absence and finally retired in 1893. Exactly at that time, i.e. the end of 1889, according to the *Yearbook* of the Brussels Conservatoire, Mahillon's 'Bach' trumpets in D were introduced into the Conservatoire concerts for a performance of parts of Bach's *B minor Mass*.[119] Other performances with *clarino* parts followed, including a complete performance of Bach's *B minor Mass*, his *Magnificat*[120] and parts of his *Christmas Oratorio*. In 1890, four 'Bach' trumpets in D, made by Mahillon were listed in a special inventory of musical instruments that were put at the disposal of teachers and students of the Brussels Conservatoire, and this inventory indicates which instruments were taken by whom:

> No. 28: Petite trompette en ré aigue / Facteur: Mahillon Alphonse Goeyens (1 September 1890) Corneille Van Uffelen (8 September 1892) A. De Coster (September 1907)
>
> No. 29: Petite trompette en ré aigue / Facteur: Mahillon Michel [?] (6 October 1890) Corneille Van Uffelen Alphonse Goeyens (9 Avril 1897)
> Cet instrument a été acheté par Baekens professeur de trompette au Conservatoire de Gand en 1898. [*This instrument has been acquired in 1898 by trumpet teacher Baekens of the Ghent Conservatoire.*]
>
> No. 30: Petite trompette en ré aigue / Facteur: Mahillon Keyaerts (7 October 1890) Albert Grillaert (8 September 1892) Albert Grillaert (27 September 1908) retour au dépôt: 29 avril 1909 [*This instrument returned to the storage: 29 April 1909*]
>
> No. 31: Petite trompette en ré aigue / Facteur: Mahillon [?] Strauwen (13 October 1890) A. De Coster retour au dépôt [*This instrument returned to the storage*]

As the inventory makes clear, the *petites trompettes en ré aigu* that the Conservatoire bought from Mahillon were intended for Alphonse Goeyens (1867–1950),[122] Duhem's successor as a trumpet

[116] [Anon.], 'Blasinstrumente auf der Antwerpener Ausstellung', *Zeitschrift für Instrumentenbau*, 21 September 1885, p.441.

[117] Constant Pierre, *La facture instrumentale à l'exposition universelle de 1889. Notes d'un musicien sur les instruments à souffle humain nouveaux et perfectionnés* (Paris: Librairie de l'Artiste indépendant, 1890), pp.116–117.

[118] Verdegem (2015), p.83.

[119] 'III. Credo de la Messe solennelle (hohe Messe) en si mineur [de] J. S. BACH. N°2. Choeur à 4 voix, avec violons, altos, basses et orgue; hautbois, trompettes (Petites trompettes en ré aigu à pistons, construites pour le Conservatoire par M. V. Mahillon) et timbales.' See *Annuaire du Conservatoire Royal de Musique de Bruxelles [Brussels]*, 1890, p.120.

[120] The concert programme mentions 'Magnificat (1723)', suggesting that the E flat version Bach had intended for Leipzig was used. See *Annuaire du Conservatoire royal de musique de Bruxelles*, [Brussels], 1893–1894, p.151.

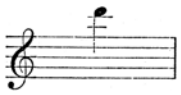
[121] See ARC-017 at the Library of the Brussels Conservatoire.

[122] *Annuaire du Centenaire 1832-1932. Conservatoire royal de musique de Bruxelles*, [Brussels], [1932], p.25.

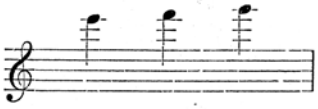
C. MAHILLON & CO.'S

BACH AND HANDEL TRUMPET

THE new Sopranino Trumpet in D has been specially constructed for the performance of works of Bach and Handel, the hearing of which in their integrity has been denied on account of the extremely difficult parts in them written for the trumpets. Upon this new instrument the upper D



can be obtained with comparative ease, and a good player with little practice will reach E, F, G.



These on this sopranino D trumpet are 9th, 10th, 11th and 12th tones in its series of harmonics, which, on the large D trumpet, are the 18th, 20th, 22nd and 24th, and the manifest advantage in facility of execution afforded by the smaller instrument, arises from these notes occupying that relative position in the scale where the attack is easy to the player.

Since Bach, in many of his Church Concertos writing for the D trumpet, revels in long passages amongst its highest possible harmonics, reaching perpetually to the 16th, and at times beyond this, it is evident that he could rely upon players able to perform his passages as he wrote them. In default of proper trumpets, and of vigorous trumpet players in these days, able to reach and sustain the high notes demanded, important works both of Bach and Handel have only been performed in recent times with the aid of cornets, mostly built in A, and compelling the player to transpose; but the tone of the cornet does not possess the quality required, and it lacks the penetration, the brilliancy, and blare of the true trumpet-tone, and on all hands it is admitted and deplored that the cornet fails to produce the effects intended by the composer.

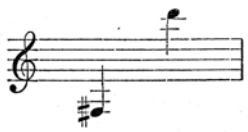
To understand why this should be, it has to be considered that the quality accepted as veritably trumpet-tone, is constituted by the presence in unabated strength of all the higher harmonics in the series beyond the particular pitch of the note sounded, *associated with that note;* and so of every note sounded it is known to be a compound

Figure 22a. *Description of the 'sopranino' trumpet in high D from Mahillon's 1896 General illustrated Catalogue.*

of many harmonics, and not the least valuable, as affording the specific clang of the trumpet, are the naturally dissonant sounds, 7th, 11th, 13th, 14th, &c. Hence, for the attainment of its essential quality, the make of this little D trumpet *throughout the greater part of its length* is strictly cylindrical, because the energy necessary to hold in sustained excitement these harmonic accessory tones, is to be fully conserved only in a tube of cylindrical form, being the mechanical consequence of its unvarying diameter. On the contrary, all the cornets having the conical form of tube the practical difference is, that the strength of the vibratory impulses from the breath of the player must be constantly lessening on account of the continually increasing area of the tube, expanding as it does from intake to outlet, viz., from mouthpiece to bell; the energy, therefore, is expended in sustaining in fuller power the lower harmonics in the associated series, with the result of weakening the higher ones; thus causing that difference in quality which the ear readily perceives. The cornet is by its nature dull in quality compared with the trumpet's brightness, and no playing can ever make it rival the earlier instrument for which the great masters wrote.

Another point of vital importance in determining the character of the instrument, is the form of its mouthpiece; in this the trumpet and cornet are distinct, and the trumpet demands a shallower cup. Until the ideal mouthpiece is obtained, one capable of expanding, contracting, and automatically changing in suitable proportions to each note successively produced, every mouthpiece has to be a compromise, affording an average suitability for all notes in the compass of the instrument. The particular form and the capacity of cup are specially determined by the experience of the maker, after many experiments to attain the best shape. That the mouthpiece now decided upon for C. MAHILLON & Co.'s new sopranino D trumpet makes the instrument remarkably fluent is the concurrent testimony of all the players who have tried it.

Compass of C. MAHILLON & Co.'s Sopranino D trumpet.



		£	s.	d.
54.	**SOPRANO TRUMPET** in D, 3 valves	6	6	0
	Silver Plating in the best style	2	2	0
	Wooden box, padded and fitted	0	17	0
	Black enamelled or brown leather case	1	6	0

Figure 22b. *Description of the 'sopranino' trumpet in high D. (continued)*

teacher at the Brussels Conservatoire, and for musicians recruited from the students and colleagues of Goeyens and from former students of Duhem.[123]

What happened in 1874 is an unanswered question: whether Mahillon was forced to stop making the trumpet in high D because the trumpet virtuoso who had to perform the solos refused to play it, of for another reason? The 'Historical notice' does not inform us. In any hypothesis, the change in attitude, at the Brussels Conservatoire, towards the use of 'Bach' trumpets in D made by the Mahillon Company came with the young virtuoso Alphonse Goeyens. A precise definition of Mahillon's 'Bach' trumpet, follows in 1891 in *L'Écho musical*: it is described a 4-ft instrument – half the tube length of a Baroque trumpet – with valves, allowing the *clarino* parts of Bach and Handel to be played; the instrument is pitched in D and it sounds an octave higher than the ordinary trumpet:[124]

> A small trumpet in high d, sounding at the higher octave of the ordinary trumpet [...] which had to come from Belgium, where a clever artist-maker, M. Mahillon, resuscitated it.

Again five years later, the 1896 *General illustrated Catalogue* dedicates two pages on the N° *54. Sopranino Trumpet, in high D, 3 valves, first class [...] specially recommended for the performance of Bach's and Handel's music* (see Figure 22 on preceding pages, the trumpet shown in Figure 23 below may correspond to this model).

Three years later, in the Dutch *Algemeenen catalogus*, this instrument is described as the Goeyens model no. 54, intended for the same purpose, the performance of the works of Bach and Handel.[126] This model was further available in the commercial catalogues of the Mahillon Company of 1908, 1911 and 1914. In the commercial catalogues of

Figure 23. *Trompette en ré aigu C. Mahillon, after 1878 (B.B.mim 1981.018.01).*

[123] Corneille Van Uffelen was a trumpet student with Hippolyte-Jean Duhem and later with Alphonse Goeyens. In 1900 he was appointed as museum guard in the *Musée Instrumental*. A. De Coster was a trumpet player at the Monnaie Opera House. Keyaerts was a trumpet student with Hippolyte-Jean Duhem till 1889. Albert Grillaert was a trumpet student with Alphonse Goeyens. In 1893 he became 'moniteur de trompette', i.e. assistant of Goeyens.

[124] 'Une petite trompette en *ré* aigu, qui résonne à l'octave supérieure de la trompette ordinaire [...] que l'on a dû faire venir de Belgique où il a été ressuscité par un facteur-artiste très habile, M. Mahillon.' See *L'Écho musical* (15 March 1891), p.66.

[125] There is not a single argument in this commercial catalogue of the Mahillon Company that sustains Blandford's assumption that these trumpets in D were straight trumpets – see Blandford (1935), p.75.

[126] '54. Trompet sopranino, in scherpe *ré*, met 3 pistons, model Goeyens […] voor de uitvoering der groote werken van J. S. Bach en Haendel.' See *Algemeenen catalogus* 1899, p.42.

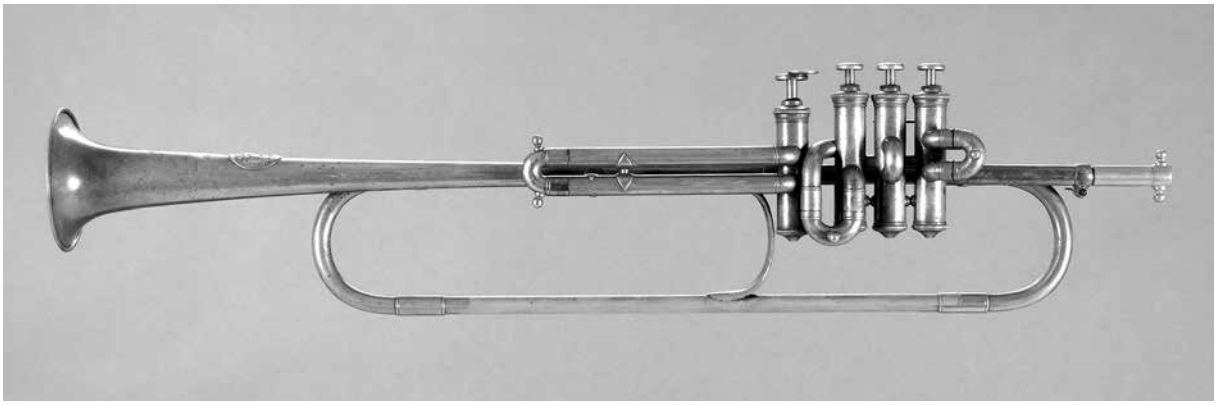


Figure 24 (*See also the colour section). Trompette piccolo en si♭ aigu C. Mahillon, modèle Goeyens No. 521 (B.B.mim R0027). The lower loop is dummy tubing.*

1914 and post 1932, Théo Charlier had his own model of a trumpet in D developed, i.e. model no. 310.

Eventually, Mahillon turned to piccolo B♭ trumpets for his 'Bach' trumpets[127] with the Goeyens model no. 521 with a straight bell,[128] which was mentioned in the commercial catalogues of the Mahillon Company in 1908, 1914 and post 1930 (see Figure 24 and colour section). The piccolo B♭ trumpets are more comfortable for playing the trumpet part of Bach's *2nd Brandenburg Concerto*.[129] The first performance of this concerto at the Brussels Conservatoire took place on 23 February 1902 and this is perhaps a terminus *ante quem* for the introduction of the high B♭ Goeyens model with a straight bell.[130]

Given this chronology of the introduction of Mahillon's 'Bach' trumpet one can understand why most scholars have dated the instrument to the beginning of the 1890s. Herbert Heyde has suggested *c*1890,[131] however, without mentioning the maker's name; Philip Bate gave 1892 as the date of the first 'Bach' trumpet by Mahillon,[132] Blandford gave 1894,[133] Edward Tarr[134] and Wallace and McGrattan[135] follow Dahlqvist,[136] who dated Mahillon's first D trumpet to *c*1870, the use of the D trumpet by Goeyens to 1890, and the piccolo B♭ trumpet to *c*1905/1906. V.-Ch. Mahillon designed, and his firm supplied, faithful reproductions of historical musical instruments for four historical processions,[137] the most important and best documented of which was the 1892 Antwerp commemoration of the 1561 *Landjuweel* – a Flemish

[127] 'The usefulness of this is strictly limited, being nowadays almost entirely confined to the performance of the second Brandenburg Concerto, for which some players find it preferable to the older F instrument', thus Bate (1978), p.192. See also Bryan Proksch, 'The Context of the Tromba in F in J. S. Bach's Second Brandenburg Concerto, BWV1047', *Historic Brass Society Journal* 23 (2011), pp.43–62.

[128] See 'Plate 15/D' in Bate (1978), p.[i]. Bate dates this 'Bach' trumpet *c*1892.

[129] Wallace and McGrattan (2012), p.225.

[130] '521. Trompette sopranino, en *sib*, à l'octave aiguë du cornet, du bugle et de la trompette soprano en *sib*, modèle Goeyens. Cet instrument est adopté par M. Goeyens, pour sa classe du Conservatoire royal de Bruxelles.' See the commercial catalogue *Manufacture générale d'instruments de musique Mahillon & Co*, 1908, p.27. Herbert Heyde dates the instrument to 1905. 'Die erste Hoch-B-Trompete, Sopranino- oder Pikkolotrompete konstruierte Mahillon 1905 in Brüssel für den Trompeter A. Goeyen [sic], der darauf das 2. Brandenburgische Konzert spielte.' See Heyde (1987), p.199.

[131] 'Inzwischen machten die hohen D-Trompeten, die zuerst um 1890 in Brüssel und 1892 in England für Bach-Partien gebaut wurden, von sich reden.' Heyde (1987), p.199.

[132] 'The first of these [smaller valve trumpets] emanated from the Brussels firm of C. Mahillon and Co. in 1892.' See Bate (1978), pp.191–192.

[133] Blandford (1935).

[134] Tarr (2004), pp.21–25; and Edward H. Tarr, 'Bach trumpet', in Laurence Libin ed., *The Grove Dictionary of Musical Instruments*, 2nd ed. (Oxford: Oxford University Press, 2014), vol.1, pp.161–62.

[135] John Wallace and Alexander McGrattan, *The Trumpet* (New Haven and London: Yale University Press, 2012), p. 227.

[136] Reine Dahlqvist and Bengt Eklund, 'The Bach Renaissance and the Trumpet', *Euro-ITG Newsletter* 1 (1995), pp.12–17.

[137] Ignace De Keyser, 'Processions with Wind Bands in the Low Countries from the 14th to the 18th century and their Revival in the late 19th century'. In *Utrecht Symposium: The Brass Tradition in the Low Countries and Beyond* (Utrecht: Stimu, 2006), pp.121–135.

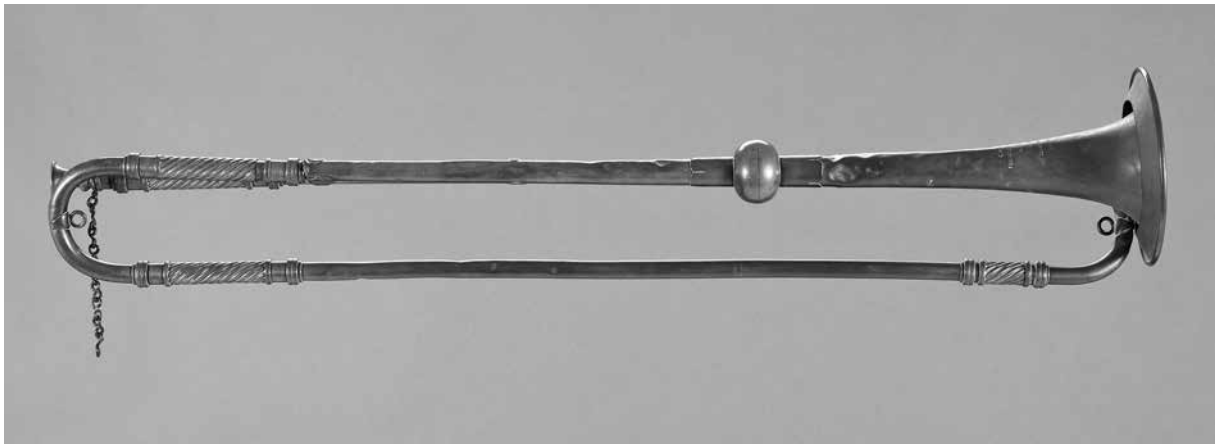


Figure 25. *Copy of a Nuremberg trumpet by the Mahillon Company for use in a historical procession (B.B.mim 2002.007).*

tradition of theatre contest.[138] *L'Écho musical* describes the musical instruments used in detail and indicates which originals were reproduced: among them are 74 Baroque trumpets based on an original Nuremberg not specified instrument in the Brussels MIM (see Figure 25).

BRASS INSTRUMENTS FOR THE OPERA

Mahillon's range of brasswind for use at the opera was relatively large. It included the Wagner tubas in B♭ and F with four valves, contrabass tuba in B♭ with 4 valves, bass trumpet with 4 valves, contrabass trombone in B♭ with 4 valves and *Stierhorn* in D, D♭ and C for *Der Ring des Nibelungen*, natural 'royal' trumpets for *Lohengrin*,[139] a natural trumpet in high C for Giuseppe Verdi's *Otello*, the Theban trumpets in B♮ and A♭ with one valve for the latter's *Aida*, the Roman buccin without valves for *Herodiade* by Jules Massenet and *Les Pyrénées* by Felipe Pedrell, and a hunting horn in E♭ for *Sint Godelieve* by Egdar Tinel.[140] Remarkably, these operatic instruments are only mentioned in the 1899 and 1908 trade catalogues. Apparently, they were added relatively late to the company's range.

Wagner's *Ring* was produced at the Brussels Monnaie Opera for the first time in 1883, in German, during a tour by the Angelo Neumann company. Just before that, in May 1881 in Berlin and a year later in London, Neumann and his itinerant troupe had brought the complete *Ring* cycle with the Bayreuth stage sets he had purchased from Richard Wagner. Revivals in French by the Monnaie company occurred in 1887 (*La Valkyrie*), 1891 (*Siegfried*), 1898 (*L'Or du Rhin*) and 1901 (*La Crépuscule des dieux*). The whole *Ring* cycle by the Monnaie company followed 1903. All these productions took place under directors who were entirely devoted to the Bayreuth cause: Joseph Dupont joined by Alexandre Lapissida (1886–1889), and Maurice Kufferath joined by Guillaume Guidé (1900–1914).[141]

Those early performances of Wagner's *Ring* in Brussels were not accidental events. As early as 1872, various prominent intellectuals in Brussels formed a committee to support the construction of Wagner's *Festspielhaus* in Bayreuth. V.-Ch. Mahillon became a member.[142] Another member, Joseph Dupont,

[138] 'Le "Landjuwee" d'Anvers', *L'Écho musical* (31 July 1892), pp.184–186.

[139] Wagner's scoring for on 'stage trumpets in *Lohengrin* (Leipzig: Breitkopf & Härtel, 1887) requires up to 12 natural trumpets in up to four keys. It is not clear if crooks were used to alter the tonality of the Mahillon trumpets.

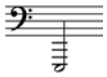
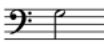
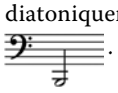
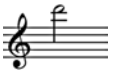
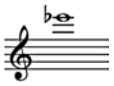
[140] *Algemeenen catalogus* 1899, p.65, (for the Dutch market) and the 1908 *Catalogue général*, p.50.

[141] Roland Van der Hoeven, 'Les représentations wagnériennes à la Monnaie (1875–1914)', in Manuel Couvreur ed., *La Monnaie wagnérienne* (Brussels: ULB, 1998), pp.41–78, at p.46.

[142] In 1877 the list of paying members of the *Comité belge du patronat de Bayreuth* includes besides Victor Mahillon, conductor Joseph Dupont, French composer Henri Duparc, director of the Brussels Conservatoire Fr.-A. Gevaert, music critic and opera director Maurice Kufferath, philosopher and politician Henri La Fontaine, patron of the arts Octave Maus, and music publishers Jean & Pierre Schott, among others. Even after the first *Ring* cycle in the new *Festspielhaus* under Hans Richter in 1876, the committee continued to support Bayreuth. In 1879, the socialist pacifist and later Nobel Prize winner Henri Lafontaine took charge of the association; he made translations of Wagner's opera librettos, and promoted the latter's music through his Masonic networks and in the labour movement. See David Vergauwen, 'Wagner en Brussel. Over Henri Lafontaines Wagnervereniging en haar banden met de Brusselse culturele wereld (1870–1900)', *Revue belge de philologie et d'histoire* 92/4 (2014), pp.1176–1183, and Appendix, pp.1207–1208.

promoted Wagner's music through his *Concerts Populaires*.[143] As director of the Monnaie Opera, Dupont conducted the 1887 *Valkyrie* production, for which several Parisian composers visited Brussels.[144]

In 1884, a year after Neumann's production of the *Ring* in Brussels, V.-Ch. Mahillon expressed himself rather critically about Wagner's use of brasswind instruments in the tetralogy, referring to an article by Oscar Franz in Paul de Wit's *Zeitschrift für Musikinstrumentenbau* earlier in 1884.[145] After quoting the remarks on orchestration in the preface of Schott's edition of Die Walküre, V.-Ch. Mahillon confirmed the thesis put forward in that article:[146]

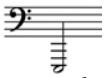
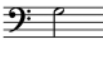
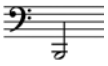
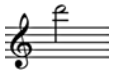
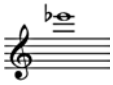
> Au sujet des *Tuben* l'explication donnée par M. Oscar Franz indique très exactement la nature de ces instruments : la forme est indifférente, mais on l'a faite à peu près semblable à celle de l'instrument que nous appelons bugle baryton. Les cylindres sont maniés pour la main gauche, pour ne pas embarasser le corniste qui est habitué de jouer le cor de la même façon.
>
> Pour la transposition recommandée par [Wagner] dans la préface [de la *Valkyrie*], il a lieu de remarquer que les parties imprimées dans la partition correspondent exactement à celles que l'on écrivait pour des bugles altos en *mi*♭ et des barytons en *si*♭; que ces parties, la question de timbre réservée, pourraient se jouer par ces instruments. Il en résulte, malgré que les instruments destinés à remplacer ceux-ci soient respectivement à la quarte grave, que les parties doivent être transposées à la quinte inférieure par suite de la notation spéciale du cor et de la trompette adoptée aussi pour les *Tuben* et dont les parties s'écrivent à l'octave grave de celles des bugles pour les sons de même hauteur. C'est du reste de cette façon que les parties de *Tuben* sont écrites dans *Rheingold*.
>
> Le bass-tuba employé dans les *Nibelungen* correspond exactement à l'instrument que nous appelons bombardons-contrebasse en *si*♭ […]. [Le] trombone-contrebasse que Richard Wagner a [...] introduit à l'orchestre [...] est à l'octave grave du trombone-ténor; il est muni actuellement de quatre cylindres. Dans le *Rheingold*, Wagner le fait descendre jusqu'au  .
>
> Le maître emploie aussi trois trombones-ténors, dont le troisième est traité en trombone-basse et muni, à cet effet, de quatre cylindres, car dans la même partition, il le fait descendre diatoniquement en *ut* depuis le  jusqu'au  . Il eut été plus rationnel d'employer un trombone-basse de préférence au trombone ténor, l'octave grave de celui-ci manquant de justesse. Cependant, la préface de l'ouvrage, dans la note relative à la composition de l'orchestre, dit bien que ce sont trois trombones ténors-basses.
>
> Au sujet de la trompette basse, il y a erreur manifeste qu'il importe de rectifier […]. On sait que la trompette basse en *mi*♭ est à l'octave inférieure de la trompette en *mi*♭, la trompette basse en *ut* (longueur théorique 5m258) est à l'octave inférieure de la trompette en *ut* […]. Il est évident que Wagner a eu l'intention d'écrire pour ce dernier instrument […].
>
> Dans la *Walküre* Wagner emploie la trompette basse en *ré* jusqu'au  c'est-à-dire jusqu'au dix-huitième son de la série harmonique et dans *Rheingold* il écrit la partie de trompette basse en *mi*♭ jusqu'au  ou 19e son !
>
> Il est évident que la substitution par les instrumentistes d'un instrument à l'octave supérieure, est jugée nécessaire pour la trompette ordinaire, qui de nos jours, ne s'emploie guère au-delà du son 12 vers l'aigu, cette substitution devient, par suite des mêmes raisons, indispensable pour l'exécution d'une partie de trompette basse écrite dans ces régions extrêmes de son étendue.

[143] Between 1877 and 1899, the year of his death, Dupont conducted a concert almost every spring with mainly instrumental excerpts from the *Ring* in the *Concerts Populaires*. See Christophe Pirenne, 'Joseph Dupont and Richard Wagner', *Revue de la Société liégeoise de musicologie* 23–24 (2004), pp.19–41, at pp.37–41.

[144] Among them were Jules Massenet, Emmanuel Chabrier, Léo Delibes, Ernest Reyer and André Messager. See Vergauwen (2014), pp.1182–1183.

[145] Oscar Franz, 'Die neuen Musik-Instrumente Richard Wagner's', in 'Vermischtes', *Zeitschrift für Instrumentenbau* 5/4 (1 November 1884), p.46, available online at <https://daten.digitale-sammlungen.de/bsb00004231/images/index.html?fip=193.174.98.30&seite=50&pdfseitex=>.

[146] V. Mahillon, 'Les nouveaux instruments de Musique de Richard Wagner', *L'Écho musical* (25 December 1884), pp.290–293.

> On the subject of the *Tuben*, the explanation given by Mr Oscar Franz indicates very precisely the nature of these instruments: the form is indifferent, but they were made more or less similar to the instrument we call baritone flugelhorn. The [rotary] valves are arranged for the left hand, so as not to inconvenience the horn player, who is used to playing the horn in this way.
>
> For the transposition recommended by [Wagner] in the preface [to the *Valkyrie*], it should be noted that the parts [of the 'Wagner' tubas] printed in the score correspond exactly to those written for alto flugelhorns in E♭ and for baritones in B♭; that these parts, apart from the question of timbre, could be played by these instruments. As a result, although the instruments intended to replace them sound respectively a fourth lower, the parts must be transposed to the lower fifth as a result of the special notation for horns and trumpets, which has also been adopted for the tubas, the parts of which are written in the lower octave compared to that of the bugles for the sounds of the same pitch. This, by the way, is how the parts for the tubas are written in *Rheingold*. The bass-tuba used in the *Nibelungen* corresponds exactly to the instrument we call the B♭ contrabass bombardon. The contrabass trombone that Richard Wagner introduced to the orchestra […] is an octave lower than the tenor trombone; it is currently equipped with four cylinders. In *Rheingold*, Wagner takes it down to  .
>
> The master also uses three tenor trombones, the third of which is treated as a bass trombone and equipped with four cylinders for this purpose, because in the same score, he makes it descend diatonically in C from  to  .
>
> It would have been more rational to use a bass trombone instead of a tenor trombone, as the latter's lower octave is not accurate. However, the composition of the orchestra given in the preface to the entire opera, clearly states that they are tenor-bass trombones.
>
> With regard to the bass trumpet, there is a manifest error that must be rectified […]. The bass trumpet in E♭ is an octave lower than the trumpet in E♭, the bass trumpet in C (theoretical length 5.258m) is an octave lower than the trumpet in C [...]. It is obvious that Wagner intended to write for the latter instrument[...]. In the *Valkyrie* Wagner uses the bass trumpet in D up to  i.e. up to the eighteenth sound of the harmonic series and in *Rheingold* he writes the bass trumpet part in E♭ up to  or the nineteenth harmonic! For instrumentalists [of our time] an instrument at that upper octave must evidently be substituted by the ordinary trumpet which nowadays is hardly used beyond the 12th harmonic; this substitution becomes, for the same reasons, indispensable for the performance of a part of a bass trumpet written in these extreme regions of its extent.

V.-Ch. Mahillon's criticism is in line with his scepticism towards saxhorns, which in his eyes are nothing but valve bugles. In a similar vein, a (contrabass) tuba is nothing but a 'bombardon'. His no-nonsense attitude also anticipates Gevaert's views on Wagner tubas reflected in his 1885 *Nouveau traité d'instrumentation* – even though called saxhorns by this author.[147] Nothing is heard about Wagner brass instruments for the *Ring* until 1893, when the instruments discussed in V.-Ch. Mahillon's article appear in the *Fanfare wagnérienne* (Wagner Band), conducted by the trombone teacher of the Conservatoire, Henri Séha.[148] The Wagner band mainly performed at proclamations and festivities at the Conservatoire. The Wagner tubas were perhaps also used for performances of excerpts from the *Ring* in the *Concerts Populaires* conducted by Joseph Dupont. The last performance of the band was a tribute to Henri La Fontaine – one of the members of the committee for the *Festspielhaus* – on the occasion of awarding him the Nobel Peace Prize in the Masonic Lodge *Les Amis philanthropes* at the end of January 1914 – ironically, a few months prior to the outbreak of the First World War.

Séha's influence on the design, especially of the Wagner tubas, cannot be ignored.[149] Whether the

[147] Ignace De Keyser and Arnold Myers, 'Wagner tubas, saxhorns, horns and Mahillon's Wagner Band'. Paper presented at the 51st International Horn Symposium 'Moving Horns', Ghent, Belgium, 1–6 July 2019.

[148] 'Au Conservatoire', *L'Écho musical* (1 July 1894), p.148.

[149] For details see Arnold Myers and Ignace De Keyser, 'Mahillon's Wagner Tubas Revisited', *The Galpin Society Journal* 74 (2021), pp.152–163.

Brussels Monnaie Opera ever used Mahillon's Wagner tubas is not known; one remains in the Brussels Conservatoire, the other three have been moved to Brussels MIM. In London, where the Mahillon Company maintained a shop selling Brussels-made instruments, the Royal Italian Opera (Covent Garden) acquired a set of four Mahillon Wagner tubas, three of which survive, along with a bass trumpet in 7-ft D and a Stierhorn in 4-ft C by Mahillon. A set of four Wagner tubas were purchased by Sir Henry Wood, three of which remain at the Royal Academy of Music in London. A complete set of four Mahillon tubas survives in the historic instrument collection of the Conservatorio di Musica San Pietro a Majella, Naples along with a Mahillon six-valve contrabass tuba in F (an associated bass trumpet is now missing). What may have been the final set to have been made is in Rome, at the Museo Degli Strumenti Musicali, Galleria Dell'Accademia Santa Cecilia where three tubas are extant together with a Mahillon three-valve bass trombone in F. Even in the small population of Mahillon Wagner tubas the bore profiles are not the same. There are two slightly different Mahillon models, the earlier Brussels MIM set and an unattached Edinburgh University instrument being distinctly higher in brassiness potential than all the later examples. Clearly there was a deliberate decision to reduce the proportion of near-cylindrical tubing, thus making the instruments less trombone-like and more saxhorn-like.

The Covent Garden Stierhorn by Mahillon (*c*1885) is now at the Horniman Museum in London (GB.L.hm 2007.345). This instrument in 4-ft C has a brassiness potential of 0.39 which is lower than flugelhorns, more like a Russian horn or a *Halbmond*. A trumpet in C was commissioned for the revival of *Lohengrin* in February 1878 at the Monnaie Opéra.[150]

The case of the Roman *buccina* (in fact a *cornu*)[151] is very specific. Mahillon spent the summer of 1877 in Naples with François-Auguste Gevaert in a session of 'experimental archaeology'[152] in order to support Gevaert's theoretical writings on the theory and music of the ancient world. As a result, he made several faithful copies of ancient *cornua*, but also of *tibiae* (or *auloi*) excavated in Pompeii and preserved in the Museo Nazionale of Naples. This is how Gevaert appreciated Mahillon's assistance:[153]

> Je me fais un devoir de proclamer à cette occasion le concours efficace que m'a prêté M. Victor Mahillon, en reproduisant pour moi en fac-similé les instruments du Musée de Naples et du British Museum, en facilitant avec une complaisance inépuisable les essais que j'ai faits journellement pendant trois ans sur les instruments de l'antiquité.
>
> On this occasion, I feel obliged to stress the effective assistance given to me by Mr Victor Mahillon, who reproduced for me in facsimile the instruments of the Museum of Naples and of the British Museum, and who facilitated with an inexhaustible complaisance the essays which I made daily on the instruments of the Antique Period, during three years.

Mahillon's involvement in Gevaert's 'experimental archaeology' can be seen as the trigger that motivated him to produce some 85 faithful copies of historic musical instruments for the Conservatoire Museum in the following years. He catalogued two of these *cornua* as *tuba curva* in the first volume of his *Catalogue* of the Brussels Musée instrumental (B.B.mim 0464 and 0465).[154] Such instruments were intended for *Herodiade* by Jules Massenet (1842–1912) and for *Les Pyrénées* (*Los Pireneos*, 1892) by Felipe Pedrell (Sabaté) (1841–1922). *Hérodiade* is an opera in four acts by Jules Massenet (1842–1912) to a French libretto by Paul Milliet and Henri Grémont based on the novel *Hérodias* (1877) by Gustave Flaubert. Massenet's *Hérodiade* was first performed at the Brussels Monnaie Opera on 19 December 1881, Joseph Dupont conducting; it had 55 revivals

[150] Roland Van der Hoeven, *Les représentations wagnériennes à la Monnaie (1870–1914)*, p.41.

[151] On the influence of Mahillon's copies of *cornua* and the confusion in the terminology he used see Christophe Vendries (ed.), *Cornua de Pompéi. Trompettes romaines de la gladiature* (Rennes: Presses universitaires de Rennes, 2019), pp.31–63.

[152] This term was coined by Roberto Melini to refer to the campaign of archaeo-organology of Fr. A. Gevaert and Victor-Charles Mahillon in the summer of 1877 in Naples. See Roberto Melini, 'Gevaert archeologo: gli studi sugli strumenti musicali di Pompei', *Revue belge de Musicologie* LXIV (2010), pp.119–130.

[153] Fr.-A. Gevaert, *Histoire et théorie de la musique de l'Antiquité* (Ghent: C. Annoot-Braeckman, 1875–1881), vol. II, p.652.

[154] Nine more of such *cornua* (or fragments) are at the Brussels MIM, GED0002 to GED0010.

in the following years.[155] The Mahillon Company also produced pastiches of these *cornua* with three valves which were displayed at the 1897 Brussels World Fair.[156] Two of these pastiche *cornua* from the Antwerp Opera, whose use of which cannot be excluded, are now at the Antwerp Vleeshuis Museum (B.A.mv 65.2.13 and 65.2.14). A hunting horn was made for *Sint Godelieve*, an opera by the Edgar Tinel (1854–1912)[157] on a libretto by Hilda Ram about the life of St. Godelieve of Gistel, performed for the first time at the 1897 Brussels World Fair.

Du Locle's French version of Verdi's *Aida* premiered on 15 January 1877 and had 465 revivals in the years that followed.[158] Mahillon's Theban trumpets in B♮ and A♭, were probably built for some or all of these productions. An Aida trumpet in 4-ft C, with one valve (Mahillon, Brussels, late nineteenth century) at the Antwerp Vleeshuis Museum (B.A.mv 67.1.194) has a brassiness potential of 0.71 which is typical for a nineteenth-century valve trumpet. The trumpet in C designed by Mahillon for Verdi's *Othello* was already available in 1899. This opera was premiered at La Monnaie on 22 February 1902;[159] the Mahillon trumpet could therefore have been used at that occasion.

MAHILLON'S WORKSHOP FOR BRASS INSTRUMENTS

No description is known for the first two workshops of the Mahillon manufactory in Brussels, listed in Table 2.[160]

After the transfer of the manufactory to Molenbeek-Saint-Jean, several documents addressed to the Permanent Deputation of Brabant attest to an increasing industrial activity: a request dated from 1871 concerns smelting lead, building two small forges and hammering and turning brass sheets,[161] and two other requests (in 1871 and 1875) are for the installation of a steam engine. A notice from the firm C. Mahillon,[162] but apparently written by V.-Ch. Mahillon,[163] sheds light on the functioning of a wind instrument workshop of the time and can be considered as a description of the Mahillon workshops themselves, given its author's background:

> La matière première est le laiton laminé en feuilles minces ; l'outillage principal se compose de mandrins pour repousser les pavillons ; de mandrins coniques et cylindriques avec le banc à tirer pour la fabrication des tuyaux, du tour, de machines à cintrer et de formes.
>
> La partie mécanique est d'une importance secondaire dans la production des instruments de musique. Dans l'atelier du facteur d'instruments à vent, la machine à vapeur ne vient en aide que pour remplacer la force brutale. C'est du fini de la main-d'œuvre intelligente que dépend, pour la plus grande part, la valeur de l'instrument.
>
> The raw material is brass laminated in thin sheets; the main tooling consists of mandrels for pushing out the bells, conical and cylindrical mandrels with the drawing bench for making the tubes, the turning machine, bending machines and forms.
>
> The mechanical part is of secondary importance in the production of musical instruments. In the workshop of the wind instrument maker, the steam

[155] Arthur De Gers, *Théâtre royal de la Monnaie (1856–1926). Toutes les troupes – Toutes les créations. Tous les artistes en représentation* (Brussels: P. Dykmans, 1926), p.39 ; available online at <https://gallica.bnf.fr/ark:/12148/bpt6k379071j.image>.

[156] Gaston Serpette, *Exposition internationale de Bruxelles 1897. Rapport sur les opérations du jury n° 26 (Instruments de musique et art musical)* (Brussels: J. B. Katto and Paris: A. Durand & fils, 1897), p.21.

[157] Karolien Selhorst after Luc Leytens, *Tinel, Edgar* (Biography), Studiecentrum voor Vlaamse Muziek; available online at <https://www.svm.be/content/tinel-edgar?display=biography&language=en>.

[158] De Gers (1926), p.34.

[159] De Gers (1926), p.60.

[160] De Keyser (1996), pp.72–73, 86–87 and 98.

[161] '1° Ateliers pour la fonte du plomb en petite quantité pour le cintrage des tubes d'instruments en cuivre ; 2° la construction de deux petites forges ; 3° le battage et tournage du cuivre' [Register *De Commodo et Incommodo*, Molenbeek-Saint-Jean no 151, dated 31 March 1852].

[162] Classe VIII. Instruments de musique: C. Instruments [à vent]: Notice. In *Exposition nationale de 1880. Catalogue officiel. Première section: Enseignement, arts industriels et décoratifs* 2nd ed. (Brussels: Adolphe Mertens, [1880]), pp.94–95.

[163] This same text, except for one sentence, but now signed by Victor Mahillon is included in the *Catalogue officiel. Exposition universelle de Paris 1889* (Brussels: H. Bertels et Florent, 1889), pp.I–IV.

Table 2. *Addresses of the workshops and shops of the Mahillon Company in Brussels and London.*

Date	Address	Workshop(s)	Shop
1841	rue du Pont Neuf, Brussels	YES	YES
1842	17, rue de la Digue, Brussels	YES	YES
1848	17, rue de Laeken, Molenbeek-Saint-Jean	YES	YES
1848	21 chaussée d'Anvers, Molenbeek-Saint-Jean	YES	/
1848	7, rue Frère Orban, Molenbeek-Saint-Jean	/	YES
1876	23 chaussée d'Anvers, Molenbeek-Saint-Jean	YES	/
1876	5, rue Frère Orban, Molenbeek-Saint-Jean	/	YES
1876	place de Brouckère, Brussels	/	Sheet music
1882	42, Leicester Square, London	/	YES
1889	141, Oxford Street, London	/	YES
1891	182, Wardour Street, London	/	YES
1894	9, rue Neuve, Brussels		Pianos
1894 ?	18, avenue Louise, Brussels		Pianos
1902	450, chaussée de Mons, Anderlecht	YES	/
1906 ?	117-119, rue Neuve, Brussels	/	Pianos
1906 ?	48, rue du Marais, Brussels	/	Pianos
Post 1910	85-87, boulevard du Nord, Brussels	/	Pianos *électrelles*, Harmoniums
Post 1910	175, rue de Laeken, Molenbeek-Saint-Jean	/	Wind and stringed instruments, sheet music
Post 1918	5, rue Frère Orban, Molenbeek-Saint-Jean	/	YES

> engine only helps to replace the brute force. The quality of the instrument depends to a large extent on the craftsmanship of intelligent workers.

The description of the workshops (Figure 26) by Charles Bosselet in 1885[164] gives a fairly good idea of their functioning and the state of the art:[165]

> [FACTURE DES INSTRUMENTS EN CUIVRE]
> [Tout comme un tailleur applique un patron sur un morceau de drap, un ouvrier] trace les contours du fer sur le cuivre, promène de grands ciseaux sur lesdits contours et passe sa découpure à l'un de ses confrères. Celui-ci, après avoir dentelé à la pince l'un des côtés de la pièce, plie celle-ci sur un calibre, fixe les dents et noue le tout à l'un des fils en fer. La pièce obtient ainsi l'apparence d'un cône ou d'un cylindre mal façonné. La jointe de la pièce est soudée. La pièce déficelée, est passée au feu de la forge attisée par la machine à pression atmosphérique. Le cuivre sort de là, noir et mou. Si la pièce est conique, on y introduit un mandrin, moule massif en fer, de proportions rigoureusement exactes, et qui se fabrique dans l'atelier même. La pièce ainsi chaussée est appliquée sur une machine rotative où elle subit une forte friction extérieure qui lui donne une forme parfaite, lui rend la couleur et la force résistante du métal : c'est ce qu'on appelle l'opération du repoussage dont la fin, le façonnage du bord du pavillon, est particulièrement intéressante. Pour le tube cylindrique, l'opération consiste en une double pression amenée par un curieux système d'étirage mécanique.
>
> La pièce, conique ou cylindrique, est ensuite remplie de plomb en fusion. Refroidie, elle est appuyée sur un bloc de bois où se trouvent, en relief, les contours qui conviennent à la partie de l'instrument à laquelle elle est destinée, contours qu'on l'oblige à suivre. Le bain de plomb le délivre du métal qui l'emplissait. La confection de la pièce

[164] Ch. B. [Charles Bosselet], 'Les ateliers de la maison Mahillon', *L'Écho musical* (14 May 1885), pp.111–115, and *Ibidem*, 28 May 1885, pp.122–126. A variant of this text translated into German is reproduced by Paul de Wit in Leipzig under the title 'Die Blasinstrumenten-Fabrik von Ch. Mahillon in Brüssel', *Zeitschrift für Instrumentenbau* 26 (11 June 1885), pp.316–317, and 28 (11 July 1885), pp.352–355.

[165] Bosselet (1885), p.113.

est alors terminée, et l'on a sous les yeux, soit une coulisse d'accord, soit une coulisse ou un tube de piston, soit quelque autre partie d'un instrument de cuivre.

À l'aide de l'emporte-pièce, on fait [d'une feuille de cuivre] toute une collection de petits objets de dessins et de dimensions très variés qui occupent plusieurs mains avant de recevoir la courbure voulue. D'autre part, des tiges de cuivre passent par la machine à décolleter qui en fait instantanément des boutons ou d'autres pièces pleines.

Tubes et accessoires arrivent aux bancs des ouvriers monteurs, qui ont pour tâche de les rassembler. La réunion se fait au moyen d'un soudage dont le grattoir fait disparaître les traces. Du banc des gratteurs, l'instrument passe aux polissage, travail de patience, puis à l'accordage, travail de précision.

[Pour] s'assurer qu'aucune paillette, aucun corps quelconque n'est resté dans le tube principal, ni dans les pistons, [un ouvrier] applique un tampon sur l'embouchure, et à l'aide d'un mécanisme des plus simples, le tampon a instantanément traversé tout l'instrument en faisant un petit bruit [...].

[THE MAKING OF BRASS INSTRUMENTS].
[Just as a tailor applies a pattern to a piece of cloth, a worker] traces the contours of the model on the brass sheet, moves large scissors over the contours and passes his cut to one of his colleagues. The latter, after having serrated one side of the piece with pliers, folds it onto a gauge, fixes the teeth and ties the whole to one of the iron wires. This gives the piece the appearance of a badly shaped cone or cylinder. The joint of the piece is soldered. The untied piece is passed through the fire of the forge fanned by the atmospheric pressure machine. The brass comes out black and soft. If the part is conical, a mandrel is inserted, a massive iron mould of rigorously exact proportions, which is made in the workshop itself. The part thus fitted is applied to a rotating machine where it undergoes a strong external friction which gives it a perfect shape, restores the colour and the resistant strength of the metal: this is what is known as the spinning operation, the end of which, the shaping of the edge of the bell, is particularly interesting. For the cylindrical tube, the operation consists of a double pressure brought by a curious mechanical drawing system.

The conical or cylindrical piece is then filled with molten lead. Once it is cooled, it is placed on a wooden block where the contours of the part of the instrument for which it is intended are embossed and which the piece must follow. The lead bath frees it from the metal that filled it. When the making of the piece is completed, one can see either a tuning slide, a piston slide or tube, or some other part of a brass instrument.

With the help of the punch, a whole collection of small objects of very varied designs and dimensions are made [from a sheet of brass], which require several hands before they receive the desired curvature. On the other hand, brass rods are passed through the cutting machine which instantly makes buttons or other solid pieces.

Tubes and fittings are brought to the bench of the fitters, who have the task of assembling them. The joining is done by means of soldering, the traces of which are removed by the scraper. From the scraper's bench, the instrument goes to the polishing, a work of patience, then to the tuning, a work of precision.

[To] make sure that no loose flakes or other matter has remained in the main tube, nor in the valves, [a workman] applies a plug to the mouthpiece, and by means of a very simple mechanism the plug has instantly passed through the whole instrument with a little noise [...]

With regards the tuning of the finished instruments to the different pitches used at the time, Bosselet mentions a device developed by V.-Ch. Mahillon to measure small differences in frequency, based on Jules Antoine Lissajous' optical comparator (1873) and on Johann Heinrich Scheibler's tonometer (1834).[166] The final tuning was done by means of a free-reed tuner, because of its relatively stable tuning. By activating a register, the tuner can easily produce the different pitches used at the time, i.e. A4 = 451Hz, A4 = 445Hz, A4 = 440Hz and A4 = 435Hz. We have additional information on the salaries and specialisations in musical instrument making in Brussels at the end of the nineteenth century. According to information from the *Chambre syndicale des facteurs belges d'instruments de musique*, 14 categories of workers can be distinguished in the manufacture of brasswind instruments.[167] In descending order of their hourly wage they were: a bell maker at an hourly wage of 0.70BF; a mechanic and a valve-maker at an hourly

[166] Bosselet (1885), pp.124–125.

[167] 'Séance du 20 août 1897' p.11. Document without shelf number in the archives of the Chambre syndicale des facteurs belges d'instruments à vent, kept in the Fonds Hautrive at the Brussels MIM.

Figure 26. *The workshop for brass instruments of the Mahillon Company in Molenbeek Saint-Jean, from L'Écho musical (14 May 1885), p.119.*

wage of 0.65BF; a hammerer at an hourly wage of 0.60BF; a turner, brazier and bender at an hourly wage of 0.55BF; a filer, scraper, grinder, polisher and repairer at an hourly wage of 0.45BF and a labourer at an hourly wage of 0.40BF.[168]

Several makers of brass instruments at the Mahillon factory are known by name:[169] Joseph-Édouard Persy (*b* 1824), first foreman and head of brass instrument manufacture (*premier contremaître et chef de fabrication des instruments de cuivre*), Henri Lebrun (*b* 1814?), chief valve maker (*chef pistonnier*) from 1849 onwards, his son Michel Lebrun (1836–1903), chief valve maker (*chef de la fabrication des pistons*), Joseph Degreef (*b* 1823) chief bender (*chef-ouvrier cintreur*), André Tistedon (*b* 1825) a brass turner (*tourneur en cuivre*), and Jean Verhaelst (*b* 1835?), coppersmith and bell maker (*chaudronnier-pavillonneur*).

In 1895, V.-Ch. Mahillon described a trombone (B.B.mim 1285) with a system of double valves, the idea of which came from H. Lebrun, chief valve maker of the Mahillon Company.[170] This system consists of a

[168] Patricia Van Den Eeckhout, *Lonen van Brusselse arbeiders in openbare instellingen (1809–1934): bouwvakken, ziekenhuis- en stadspersoneel* (Bruxelles; VUB, 1979), pp.11–20. (Lonen en prijzen in België in de 19e en 20e eeuw, no 10). It should be noted that the author specifies that the amounts given reflect the economic aspect of the wages, i.e. what they cost the employer and not the income of workers. The difference would be 20% less for workers.

[169] De Keyser (1996), pp.117–121.

[170] 'Cet instrument est du facteur C. Mahillon; l'idée des cylindres est de H. Lebrun, chef pistonnier de cette maison.' See Victor-Charles Mahillon, *Catalogue descriptif et analytique du Musée instrumental du Conservatoire royal de musique de Bruxelles* (Ghent: Ad. Hoste, 1909), vol.2, p.457.

set of three double valves with a return spring located in the valves themselves. V.-Ch. Mahillon does not specify the date of this 'idea', but Henri Lebrun patented a valve mechanism of this type twice (in 1856 and 1873). A trumpet dating from after 1878 uses this valve system (B.B.mim 1992.007). Michel Lebrun is mentioned by name as the head of valve production for Mahillon when he was awarded the gold medal at the 1889 Paris Universal Exhibition.[171] He would have succeeded his father in this function within the Mahillon company. According to F. Vandervost, Michel Lebrun would have been an apprentice in his father's workshop, then worked for Mahillon and finally returned to the parental workshop.[172] There is also another link between Henri and Michel Lebrun and the Mahillon company, relating in particular to the right-angled (cavalry) trombone introduced by the Mahillon firm in 1872.[173] In addition, Michel Lebrun's sons, Désiré and Pierre, took over their family business for the production of six-piston and seven-piston right-angle trombones at the turn of the nineteenth and twentieth centuries.[174]

[Joseph-]Édouard Persy joined the Mahillon company in 1838. He was to be trained in all branches of instrument making, but his speciality became brass instruments. In 1862, he became the head of that department within the company. Édouard Persy was the three-year younger brother of Mathilde-Claire Persy, who married Charles Mahillon in 1840. Born in Brussels on 5 January 1824, he was therefore 14 when he joined the company. It is not clear whether Edouard Persy entered the service because Charles Mahillon became acquainted with his older sister, or vice versa, but there is clearly a relationship of professional endogamy.

CONCLUSION

Brass instruments constituted a large part of the output of the Mahillon manufactory, which was run as a successful family business for the 100 years from 1836. For much of this time it was effectively directed by V.-Ch. Mahillon who, uniquely for a manufacturer, was a pioneer in musical acoustics and in organology, being also active as an instrument collector and museum curator. V.-Ch. Mahillon had a clear vision of the important characteristic of brass instruments, and was not afraid to enter into public disputes with leading musicologists and music critics. The instrument models offered by the firm were influenced by current trends in brasswind design, the social environment and musical practices of professional and amateur musicians, and the requirements and tastes of prominent composers and performers. The firm's innovations were practical and effective in the hands of musicians, but also displayed a rare organological approach to the design of instruments.

ACKNOWLEDGEMENTS

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[171] 'Exposition universelle de Paris en 1889. Liste des récompenses décernées aux collaborateurs. Classe XIII', *L'Écho musical* (24 November 1889), pp.124–125.

[172] Malou Haine et Nicolas Meeùs, *Dictionnaire des facteurs d'instruments de musique en Wallonie et à Bruxelles du 9e siècle à nos jours* (Liège: Mardaga, 1986), p.249.

[173] V.C.M. [Victor-Charles Mahillon], 'Nouveau modèle de trombone ténor', *L'Écho musical* (20 August 1872), pp.[ii]–[iii].

[174] Haine and Meeùs (1986), p.249.

IGNACE DE KEYSER, GÉRY DUMOULIN AND ARNOLD MYERS
Brass instrument production by the Mahillon Company

Figure 1. *L'Union fait la force. Members of the Mahillon family after Charles-Borromée's death in 1883: Alphonse, Henri, Ferdinand, Victor-Charles, Adolphe, Léon, Jules, Marie-Victorine, Henriette, Sophie, Joseph. Courtesy Dr Philippe Mahillon, Brussels.*

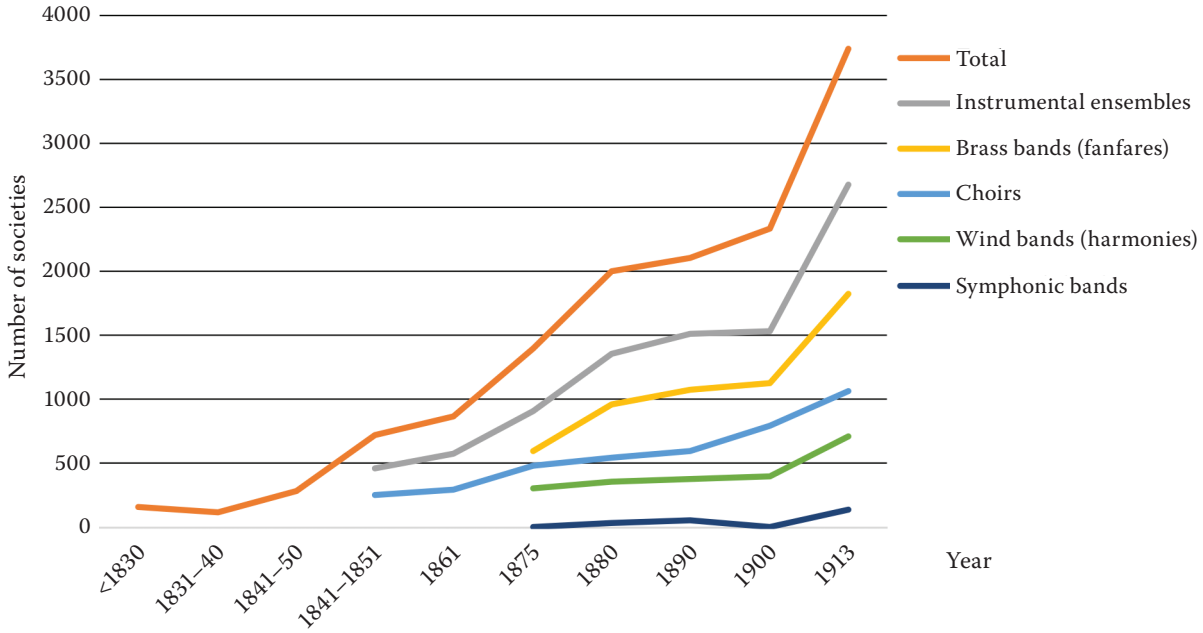

Figure 2. *Development of musical societies in Belgium in the nineteenth century and until the First World War.*

Figure 4. *Trumpet with double-piston valves and levers (B.B.mim 4371).*

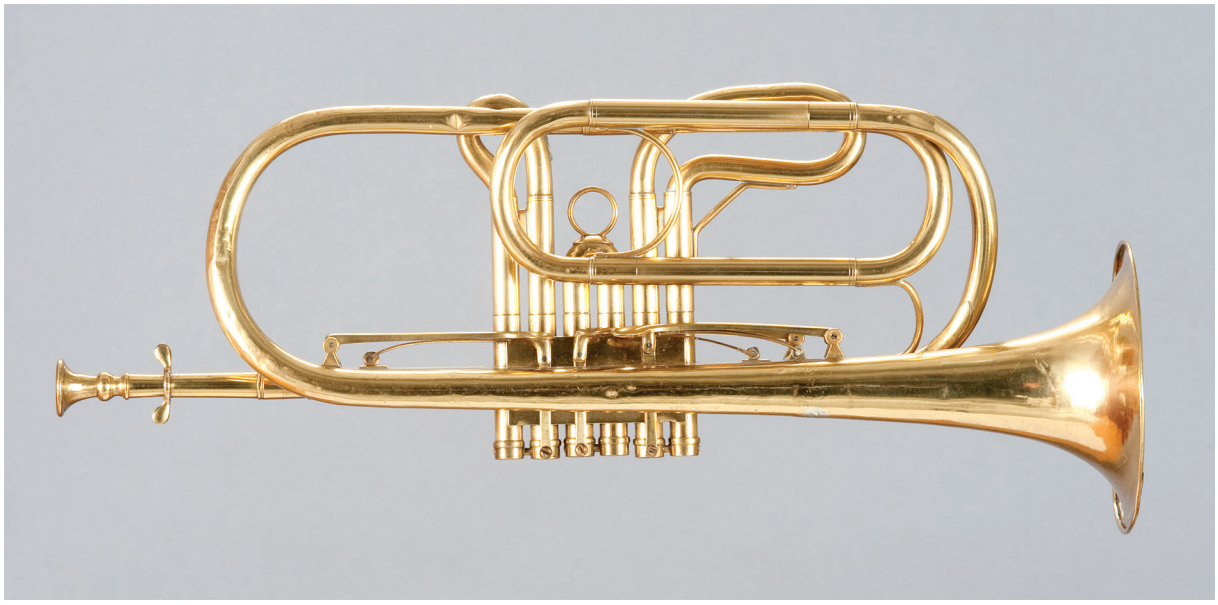

Figure 5. *Trumpet by Barthélemi Mahillon (B.B.mim 1307).*

Figure 18. *Trumpet in B♭ with double-principle 3rd valve, Goeyens model (B.B.mim R0026).*

Figure 19. *Trumpet in B♭ (B.B.mim 1984.031).*

Figure 24. *Trompette piccolo en si♭ aigu C. Mahillon, modèle Goeyens No. 521 (B.B.mim R0027). The lower loop is dummy tubing.*