

, at least in his early years in Paris, did not use the term to describe a group of inventions. In his 1845 patent he used 'saxhorn' only to indicate one type of instrument to which his invention could be applied, and otherwise used terms such as 'saxotromba'. But *The Illustrated London News* of 7 December 1844 reported a concert by Jullien, in which the Distin family played 'Sax Horns' which 'were invented by M. Sax of Paris, but have been greatly improved by the Distins'.

1. Construction.

Saxhorns have a tapered bore – except through the valves and ancillary passages which are necessarily cylindrical (though Sax patented some designs which continued conically through the valve channels) – with a fairly rapid expansion in the last section, leading to a bell of only moderate flare. (In the hands of American makers, the bell has been considerably enlarged.) The main tube has a fairly large bore relative to its length, together with many of the proportions associated with the French type of bugle (which some authorities regard as the parent instrument of the type); indeed this similarity was one of the bases on which legal appeals against Sax's patent were founded. The scale of the bore is not quite so large as that generally recognized as definitive of the tuba group (see [TUBA \(I\)](#)). A genuine new invention, has been questioned at different times. The patents were fiercely challenged by some long-established French instrument makers during Sax's lifetime, but these challenges were unsuccessful. When blown with a rather deep cup mouthpiece saxhorns easily sound their natural notes, from the 2nd natural note (with all valves operated) to the 8th natural note or higher, and this is generally, and regarded as their practical compass. On most of them their fundamental (or pedal) note can be sounded, but it is often uncertain and of poor quality when longer valve-tube lengths are brought into play. This has led some writers to make the distinction (which is of little use) between 'whole-tube' and 'half-tube' instruments. The need for the complete pedal octave on deeper saxhorns seems to have been felt quite early, and very shortly after their introduction Sax enlarged the bore of the larger members to improve that part of their compass. In so doing he sacrificed some measure of tonal homogeneity in the group but gained other advantages. Since the usual three valves, tone, semitone, and minor 3rd, can together only bridge the gap between the fundamental and the 2nd natural note to the extent of a diminished 5th, an additional valve and tubing for two and a half tones was called for, which Sax soon provided. The result was a complete family of instruments, the names and sizes of which are given in Table 1.

Table 1

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saxhorn sur-aigu	2' C or 2¼' B♭
saxhorn soprano	3' F or 3¼' E♭
saxhorn contralto	4' C or 4½' B♭
saxhorn ténor	6' F or 6½' E♭
saxhorn baryton	8' C or 9' B♭
saxhorn basse	8' C or 9' B♭
saxhorn contrebasse	12' F or 13' E♭
saxhorn contrebasse	16' C or 18' B♭

The tonal distinction between the euphonium (tenor tuba) and the baritone (see [BARITONE \(II\)](#)), both used in British brass bands and standing in the same nominal pitch, has tended to be less pronounced in some parts of the world. American makers and their followers build euphoniums to a rather narrower scale than that favoured in Britain and France. Brass basses are also built with up to six valves and of such proportions as to make their ultimate parentage, tuba or saxhorn, difficult to determine (assuming, that is, that such parentage continues to have meaning).

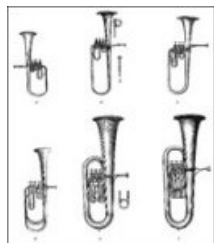
Saxhorns, in common with all other valved instruments, suffer from two acoustic defects with which players cope instinctively. The unavoidable use of a proportion of cylindrical tubing in the valve slides disturbs the regular taper of the bore to an extent dependent on the number of valves in use at any one time; this modifies the harmonic content of the sound to a variable degree. In the first saxhorns the ancillary valve tubing was coiled in circles, a feature that was said to be acoustically advantageous, but it prevented the use of telescopic tuning-slides or a device for the disposal of

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In general shape and appearance, most modern saxhorns, wherever made, present a strong family likeness. The tubing is usually folded in the manner of a large trumpet, and with the bell directed upwards the mouthpipe projects more or less at a right angle. In Germanic instruments the coiling is more strictly elliptical. The bell stands vertical, but in some American designs it is tilted sharply forward from the plane of coiling. According to Carse, Sax originally planned his whole group with forward-directed bells, but very shortly changed to the upright form as depicted in Kastner (see [illustration](#)). Later, however, he reverted to the more familiar horizontal trumpet shape for the soprano and alto members. Saxhorns have either piston or rotary valves, and both seem equally efficient.



Saxhorns from J.-G. Kastner's 'Manuel général de musique militaire' (Paris, 1848): (a) saxhorn in E \flat , (b) saxhorn in B \flat , (c) saxhorn in A \flat , (d) saxhorn in E \flat , (e) saxhorn in F and E \flat , (f) saxhorn in E \flat

2. History.

The achievement in the second and third decades of the 19th century of a fairly satisfactory valve mechanism had a profound effect on the manufacture of brass instruments. Such instruments were to gain ascendancy over those with the side-hole system, with its large padded key cups and somewhat vulnerable levers. In many parts of Europe between 1830 and 1850 makers devoted themselves to applying valves to conically bored instruments of all sizes. Some attempted to add them to tubes of bugle or ophicleide proportions, but others designed entirely new instruments.

In 1842 Sax, who was formerly associated with his father's factory in Brussels (see [SAX](#) family, (1)), came to Paris and established himself as a maker of both brass and woodwind. With the support of a

few notable patrons, in particular Berlioz, who had encouraged his move to Paris, he was soon a successful maker, to the annoyance of a number of long-established Parisian firms. A man of great ambition and inventive capacity, Sax secured a large number of patents, but it is now difficult to assess the true value of some of his ideas.

On settling in Paris one of Sax's first activities was to design what was to become known as the saxhorn. The principle involved was not entirely new, having been utilized in the French **CLAVICOR** and various German types of horn some years earlier. The proportions adopted by Sax, however, undoubtedly made his instrument superior. In 1845 Sax patented designs which were the basis of the saxhorn species, and in that year he wrote to the Minister of War, Count Rumigny, drawing his attention to them. At that period French military music in general was in decline and long due for reorganization. As a result of the deliberations of a commission headed by Count Rumigny himself, and after a public contest between an established military band and a smaller group of Sax's instruments directed by the inventor, the latter were officially adopted. Thus Sax secured what was virtually a concealed monopoly as supplier to the French army. At that time the saxhorn group ranged from soprano to bass, but within a year or so a sopranino and a contrabass in **B \flat** had been added, as well as some intermediate sizes. Provision was also made for the use of detachable transposing crooks which was at that time the custom with the cornet. By 1855 a giant contrabass or 'bourdon' in **E \flat** had been constructed; this monster is now in the Musée des Arts et Métiers in Paris.

Sax's claim that his products were something entirely new in the field of music was hotly contested by a number of other manufacturers who denied strongly that they embodied anything in the nature of a protectable invention. Powerful representations by 34 leading Parisian makers were made to the government for the annulment of the *brevets* of 1845. The result was a long series of lawsuits and counter-suits which contributed to the ruin of several famous houses and of Sax himself. He was declared bankrupt three times, yet with incredible fortitude he remained in business. The evidence suggests that Sax's claims were extravagant, even arrogant, but against this must be set his achievement in bringing order to a class of instruments which was developing elsewhere in a hopelessly irregular manner. The standards of workmanship he introduced were beyond reproach and, throughout his life, he seems to have been genuinely obsessed with the concept of consistency of tone quality.

Saxhorns were originally made in Sax's workshop; they were sold by agents such as Distin. After Sax's success in defending his patent, a number of other French makers were permitted to make saxhorns under licence. After the patent expired in 1865, makers in France and elsewhere were free to make their own saxhorns, which did not always closely resemble Sax's models.

The earliest saxhorn illustrations we have, apart from drawings in the 1845 patent (reproduced in Horwood, 2/1983, p.30), are those given by Kastner (1848, reproduced here) and from these it seems that the first valves were of the stout 'Berliner Pumpen' type. These were designed by Wieprecht in Berlin and first made there by Moritz; it was the former's contention that Sax's valves were based on those of certain instruments that he or his father had purchased from Moritz. The two men met in 1845 and as a result Wieprecht concluded that it would not be worth his while to try to obtain legal redress. Although Sax does not seem to have been above producing his own version of other men's ideas it must be remembered that in his day, and for many years after, international recognition of patent rights hardly existed. Later saxhorns were provided with the slender 'Périnet' valves and some surviving examples have the rotary valve.

Sax was particularly fortunate in the artists who first played his instruments publicly. In 1844 the **DISTIN** Family Quintet (the leading British virtuoso brass quintet) visited Paris on a concert tour during which their attention was drawn to the first experimental saxhorns. Their admiration was unbounded and resulted in a commission for a set of instruments which was completed in the same year. Those instruments became the regular equipment of the group. There are conflicting accounts of the relationship between the Distins and Sax, but it is possible that Henry Distin's version given to Enderby Jackson, the historian of brass bands, in 1895 is accurate. It is quoted at length by Russell and Elliot. Henry Distin claimed that it was he who coined the generic description 'saxhorns'. Whether this is true or not, it is certain that it was the efficiency that characterised instruments of Sax's design, and the acquisition by Distin of the British agency for them, that were the key factors in the development of the amateur brass band movement. From about 1845 the brass band started to become a widely dispersed working-class activity. The Sax-Distin relationship came at a moment in British history when social, demographic and economic conditions provided a new and fertile market for these instruments, which were durable, relatively easy to play and could be purchased through deferred payment schemes. Many Victorian brass bands were called saxhorn bands and in 1853 the first great 'open' contest at the Belle Vue Gardens, Manchester, was won by the Mossley Temperance 'Saxhorn' Band which, it was alleged, was entirely equipped with instruments of the Sax design. All the instruments imported for this band were of the upright form, including even the cornets, which Sax also supplied. They were pitched mainly in **A \flat** , which later caused difficulties when **B \flat** and **E \flat** became the standard pitches in contests. The Mossley instruments were obtained through Henry Distin who later became a manufacturer in London although he retained the Sax agency for a number of years.

In spite of his championship of saxhorns in Great Britain, Distin must bear some of the blame for the confusion between them and the large-bore tubas. The saxhorn had been used widely from the mid-1840s, when Distin had taken the franchise for Sax's instruments. However, the Distin trade catalogue of 1857 – by which time he had lost the Sax franchise – is remarkable for the avoidance of the words 'Sax' and 'saxhorn'. Although the influence of Sax on the design of brasswind is pervasive, the document gives the impression that, on losing the Sax agency, Distin felt the need to find new

names for the instruments. The bell-forward instruments are 'Flugel horns' or 'chromatic horns', and words like 'tuba' and 'euphonion' are used to describe the bell-up forms. It is likely that Distin's considerable influence lies behind many of the terms which are now common for brass instruments in Britain.

Bibliography

- J.-G. Kastner: *Traité général d'instrumentation* (Paris, 1837, 2/1844)
- H. Berlioz: 'Les instrumens de musique: M.Ad. Sax', *Journal des débats* (12 Jan 1842)
- H. Berlioz: 'De la réorganisation du musique militaire', *Journal des débats* (1 April 1845)
- H. Berlioz: 'Nouvelle salle de concerts d'Ad. Sax', *Journal des débats* (24 Feb 1847)
- H. Berlioz: 'Sax et ses instruments', *Journal des débats* (12 Oct 1847)
- G. Kastner: *Manuel général de musique militaire* (Paris, 1848/R)
- A. Sax: *Méthode pour saxhorn* (Paris, ?1851–2) [advertised in *Journal des débats*, 22 Nov 1851]
- H. Berlioz: 'M. Sax, ses procès, ses procédés pour ses ennemis vaincus', *Monde illustré* (24 Nov 1860)
- J.P.O. Comettant: *Histoire d'un inventeur au dix-neuvième siècle* (Paris, 1860)
- A. de Pontécoulant: *Organographie* (Paris, 1861)
- T. de Lajarte: *Instruments-Sax et Fanfares civiles* (Paris, 1867)
- F.-A. Gevaert: *Nouveau traité d'instrumentation* (Paris, 1885)
- J. Brousse: 'Tuba', *EMDC*, II/iii (1927), 1675–80
- M.-A. Soyer: 'Des instruments à vent', *EMDC*, II/iii (1927), 1401–82
- E. Closson: *La facture des instruments de musique en Belgique* (Brussels, 1935)
- J.F. Russell and J.H. Elliot: *The Brass Band Movement* (London, 1936)
- A. Carse: *Musical Wind Instruments* (London, 1939/R)
- P. Gilson: *Les géniales inventions d'Adolphe Sax* (Brussels, 1939) [pubd with the following]
- A. Remy: *La vie tourmentée d'Adolphe Sax* (Brussels, 1939) [pubd with the preceding]
- A. Baines: *Brass Instruments: their History and Development* (London, 1976/R)
- M. Haine: *Adolphe Sax 1814–1894: sa vie, son oeuvre et ses instruments de musique* (Brussels, 1980)
- 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, 1980)
- W. Horwood: *Adolphe Sax 1814–1894: his Life and Legacy* (Bramley, 1980, 2/1983)
- C. Bevan: 'The Saxtuba and Organological Vituperation', *GSJ*, xliii (1990), 135–46
- A. Myers: 'Instruments and Instrumentation in Brass Bands', *Bands: The Brass Band Movement in the 19th and 20th Centuries*, ed. T. Herbert (Milton Keynes, 1991), 169–95

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