The “Catholic” Fingering—First Valve Semitone: Reversed Valve Order in Brass Instruments and Related Valve Constructions

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In 1985 Joe R. and Joella F. Utley acquired a trumpet for their collection of brass instruments in which the first and the second valves are reversed (Figure 1a, b); that is, the first valve creates a descending semitone while the second valve lowers the pitch a whole tone. This is the opposite of customary practice today. This trumpet is faintly stamped on its German-silver garland, *ALOIS GENTNER IN DIL[LINGEN]* (Figure 2). Dillingen is located in south Germany, just north of Augsburg.

Figure 1a, b
Trumpet in B♭ by Alois Gentner, Dillingen, ca. 1860
(Utley/NMM, 6821. Photo: Mark Olencki).

Figure 2
Signature of the trumpet by Gentner (Utley/NMM, 6821. Photo: Mark Olencki).

For many years it was a curiosity. If handed to accomplished players to blow a few notes, it would befuddle them. A few could figure it out in a few minutes but none had ever heard of this bizarre valve order before.

Over the years, several more instruments with this valve order were acquired for the Utley Collection: a trumpet by Andreas Barth, Munich, with only two valves in this configuration (Figure 3a, b); another three-valve trumpet by Dominicus Leicher, Augsburg (Figure 4a, b); a soprano saxhorn by Isaac Fiske, Worcester, Massachusettes (Figure 5); an unsigned American cornet in which the player has the choice between the normal or the reversed valve order (Figure 6a, b); and finally a late-nineteenth-century trumpet by Conrad Weidlich, Regensburg (Figure 7a, b).

These instruments triggered a project to find as many brasswinds as possible that displayed this valve configuration. The objective was to categorize them in terms of when, where, and by whom they were made, as well as their structure. This project was started in 1995 by Joe Utley[1] and continued in 2002 by Sabine Klaus. The research is based not only on examinations of the holdings of museums and private collections, but also on the analysis of photos and descriptions in instrument catalogues. The work cannot be exhaustive, but it is possible to summarize general tendencies from what can be learned of the 172 instruments listed in Table 1.

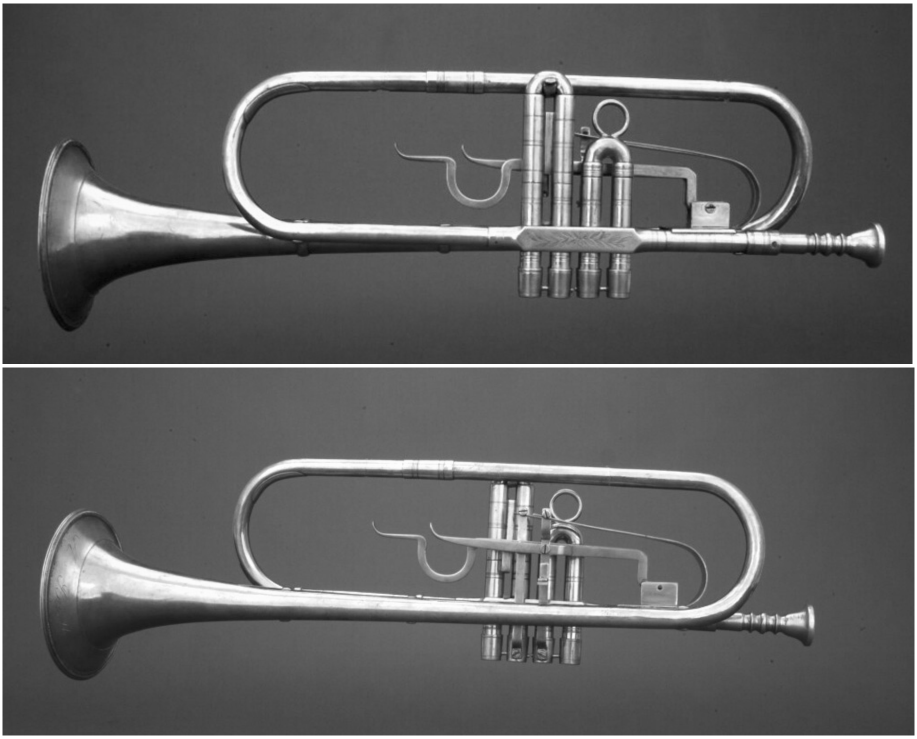


Figure 3a, b
Trumpet in B♭ by Andreas Barth, Munich, ca. 1837
(Utley/NMM, 7058. Photo: Mark Olencki).

One problem plagued this study from its inception: The authors could not examine all of the instruments personally and therefore had to rely on secondary sources in some instances. However, great caution was taken to use only the most reliable published material. Also, many colleagues, private collectors, and employees of the institutions listed in Table 1 were very helpful in filling in gaps. An important question, not always to be answered through recourse to photos in catalogues, is whether the reversed valve sequence is fixed or interchangeable. Sometimes this question remained open even when instruments were examined personally, since their condition did not allow removal of the slides. Our approach to this problem will be discussed in detail below.

Two further considerations might obscure the frequency of this valve configuration and the material presented here:

1. Some instruments were altered so as to conform to the modern valve sequence in the course of repairs.[2]

Figure 4a, b
Trumpet in G by Dominicus Leicher, Augsburg, ca. 1845
(Utley/NMM, 7189. Photo: Mark Olencki).

2. Some instruments with interchangeable valve sequence have been kept in the normal modern configuration in museums and private collections, their variable form unknown to their custodians and/or owners.[3]

Hopefully the present article will make museum staff and brass instrument collectors aware of this valve configuration; perhaps it will trigger the publication of more information on this topic. The question as to how valve sequence may relate to repertoire is beyond the scope of this essay, but would be a worthwhile study on its own.

Despite these restrictions in the reliability of the collected data (indicated by question marks in Table 1), the gathered material allows certain reasonably confident conclusions to be presented here. In fact it is very likely that our findings constitute a considerable understatement of the frequency of the phenomenon under discussion.

Figure 5
Soprano saxhorn in E♭ by Isaac Fiske, Worchester, ca. 1850
(Utley/NMM, 7062. Photo: Mark Olencki).

Figure 6a, b
Unsigned American cornet, ca. 1860 (Utley/NMM, 7023. Photo: Mark Olencki). Left: B♭ configuration with normal valve order; right: C configuration with reversed valve order; the first valve is a quick-change for A or A♭, respectively (related to B♭ pitch).

Distribution of instruments and makers, 1820-1920

The 172 instruments listed here are signed by sixty-two different makers, three more are attributed, and one is signed by the Viennese natural-trumpet makers Anton and Ignaz Kerner, though we do not know who built the valves. Thirty-two of these brasswinds are unsigned and their makers are unknown.

The earliest dated instrument with the semitone/whole-tone valve sequence is a two-valve trumpet by Michael Saurle, Munich, from 1828 (Figure 8a, b).[4] Fortunately, we know not only the date of this instrument, but also its original use: it was built for the main church, St. George, of Nördlingen, northwest of Augsburg, and most likely played from its tower (Figure 9).

Figure 7a, b
Trumpet in C by Conrad Weidlich, Regensburg, ca. 1890
(Utley/NMM, 9977. Photo: Mark Olencki).

The latest dated instrument—a fluegelhorn—is also from Munich, where it was built in 1863 by Andreas Barth. Altogether seventeen instruments are firmly dated, while one gives only the date of its patent. Most of these come from the Munich workshops of the Saurle family and Andreas Barth. An entire series of similar instruments from these workshops, with an almost unbroken sequence of dates, can be found in the ten-year period between 1828 and 1838 (with the exception of the years 1830 and 1836). The dates on the earlier instruments are engraved within a wreath motif on a sheet brass plate surrounding the double-piston valves (Figure 8b). In one instance, the trumpet DM 39149, even the original owner's name, *Stralhuber*, is engraved within this wreath; another Saurle trumpet at the Bayerisches Armeemuseum in Ingolstadt shows the initials F.P.G. below the wreath. The later instruments, built after 1835, have their dates engraved on a square tube segment going through the valves (Figure 10).

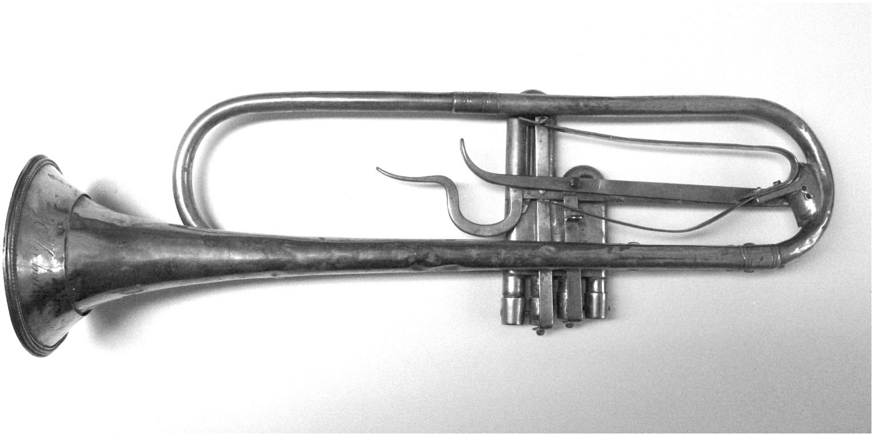


Figure 8a
Trumpet in B♭ by Michael Saurle, Munich, dated 1828
(Stadtmuseum Nördlingen, 759).

Figure 8b
Date on Saurle trumpet in Figure 8a.

Figure 9
Tower of St. George's Church in Nördlingen, with balcony for the wind ensemble.

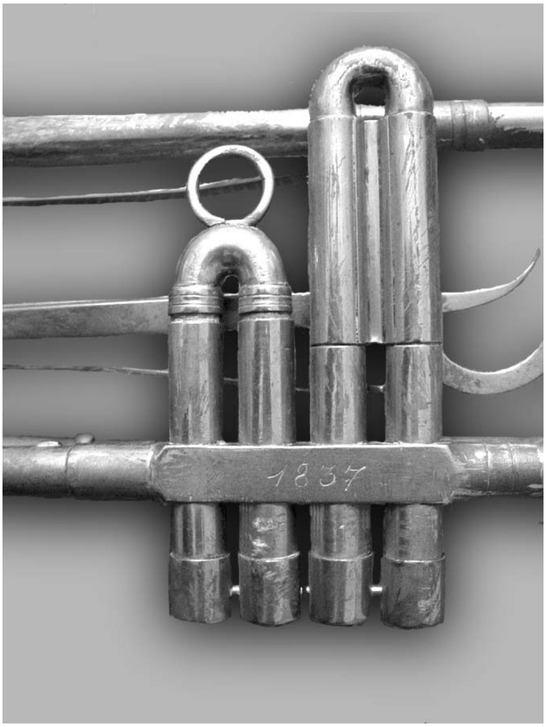


Figure 10
Trumpet in B♭ by Michael Saurle, Munich, 1837;
detail showing date (BNM, MU 202).

One early dated trumpet was built in 1829 in the Swiss workshop of Hirsbrunner in Sumiswald near Berne. Two more instruments with dates are of American provenance: an alto horn, engraved *Patented 1848,* by Thomas D. Paine, Woonsocket, Rhode Island, formerly belonging to a founding member of the American Band; and an echo cornet, dated 1851, by Graves & Co. of Boston.

The great majority of instruments are not dated, but great care has been taken to determine the approximate date of every instrument's manufacture, since the following conclusions rely heavily on such information. Every instrument yields certain clues as to its date. Such information may include details of construction as well as the maker's known dates of activity; sometimes a street address can narrow the date even further.

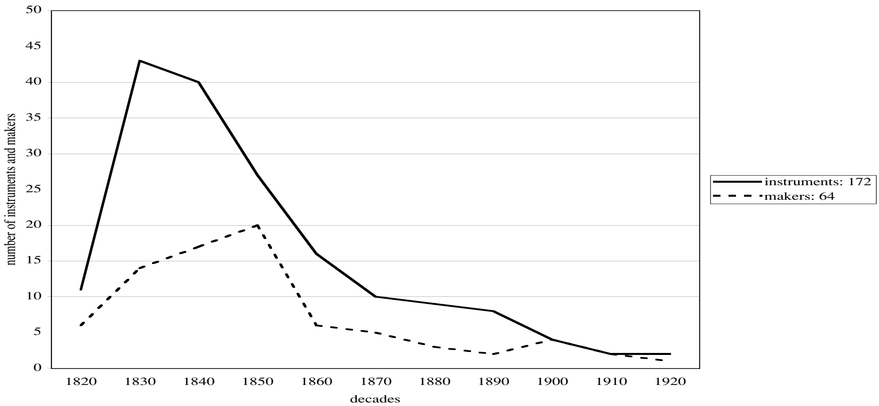


Chart 1
First-valve-semitone brass instruments and makers.

Chart 1 shows the number of instruments with reversed valve order found from each decade between 1820 and 1920 and the number of makers of such instruments active at the same time.

From this chart it is obvious that instruments with reversed valve order were most frequent in the 1830s, followed by the 1840s and 1850s. In the 1860s this feature slowly declined, as did the number of makers concerned with it. The latest maker using this feature, Anton Schöpf Jr. of Munich, was not active before ca. 1914, so we can be confident that brasswinds with reversed valve order were being built in Bavaria as late as the beginning of World War I, and most likely even later.

Country of origin

Chart 2a shows that brass instruments with the first-valve-semitone pattern were built in German-speaking regions, including Switzerland, and also in France, Belgium, Bohemia, Russia, Italy, England, Ireland, and the U.S.A.

From this chart it is obvious that the greatest activity in such instruments was in Germany in the 1830s and the 1840s. Most of the Swiss instruments were built in the 1830s by one family, the Hirsbrunners in Sumiswald, near Berne. Developments in England and Ireland were contemporary with those in Germany, but on a much smaller scale. In the U.S.A. the development is repeated about ten years later—disregarding the very earliest valve brasses made in America by Adams (see below)—also with considerably fewer numbers as compared to Germany. In German-speaking regions instruments with reversed valve order are still found in the twentieth century. As will become obvious presently from an examination of printed sources, they may perhaps have been in use that late at least in

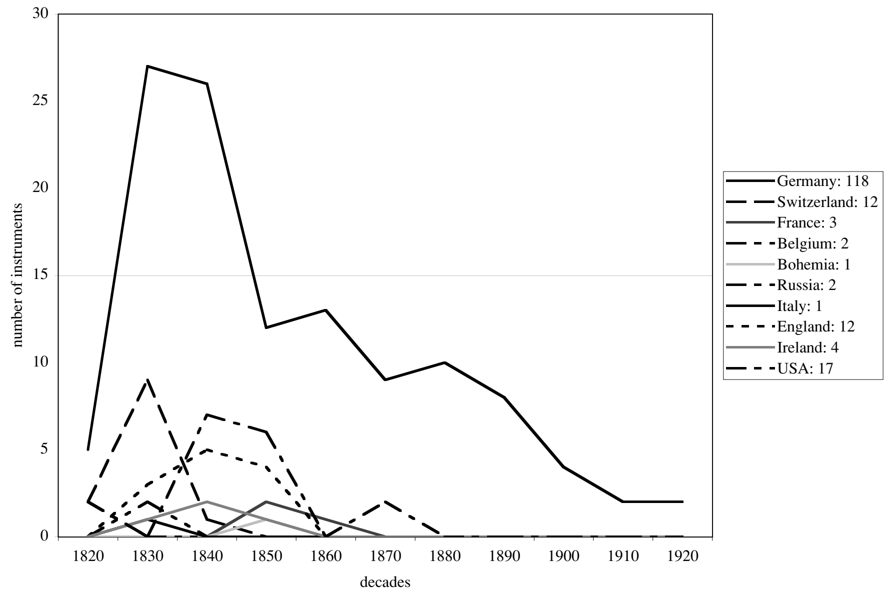


Chart 2a

First-valve-semitone instruments: chronological distribution according to country of origin.

Ireland—if not in other countries as well. It is rather remarkable that there was no such tradition in Austria, which otherwise shared similar valve constructions with other German-speaking regions, nor in Prussia; this has previously been observed by Herbert Heyde, who traces the reversed valve order back to one of the two early inventors of valves for brass instruments, Friedrich Blühmel. The other inventor of the valve, Friedrich Stölzel, positioned the whole-tone valve first.[5]

Chart 2b and the map of Germany that follows show in which regions and cities of the German-language area such instruments were produced. The overwhelming majority of these instruments were built in Bavaria—fifty-three of them in its capital, Munich, alone. But Saxony also, with its center of musical-instrument manufacture in Markneukirchen, participated in the production of brasswinds with reversed valve order, mostly in the 1830s, ’40s, and ’50s; one Markneukrichen instrument was built as late as ca. 1900. With the exception, then, of two instruments from north Germany, there were two main areas of activity in brass-instrument manufacture with reversed valve order: south Germany—mostly Bavaria, but also the neighboring regions in the southwest: Baden, Württemberg, Hesse, and Rhine Palatinate; and central Germany—primarily Saxony, but to a lesser extent also neighboring Thuringia.

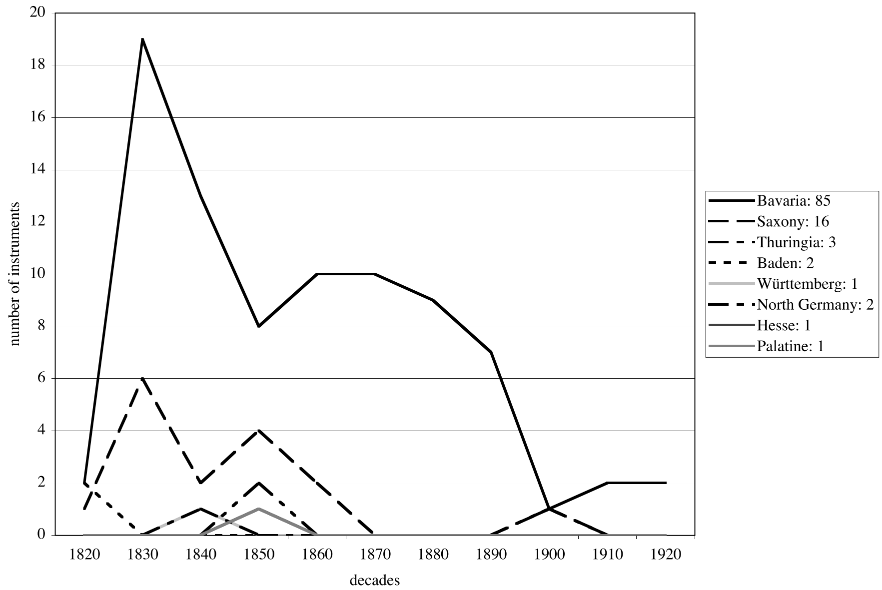


Chart 2b

Chronological distribution of instruments according to German regions.

In the earlier years, before 1850, there were two main workshops in Munich, as briefly mentioned above: the workshop of the Saurle family, comprising Michael Sr., Johann Georg Sr. and Jr., and Joseph Saurle; and that of Andreas Barth. Of the fifty-three Munich instruments, thirty-four came from these two workshops. Several members of the Saurle family were closely connected to the Bavarian court, Michael Saurle Sr. being appointed court instrument maker in 1832 and Johann Georg Saurle Sr. receiving the same title in 1851. Michael Saurle had the foremost position among all Bavarian brasswind makers, according to Erich Tremmel, in that he was the exclusive supplier to the Bavarian military.[6] (The Hirsbrunners in Sumiswald found themselves in a similar position vis-à-vis the Swiss military.) This concession gave Saurle an advantageous position, which he was able to exploit and thereby serve as a trendsetter in early valve development. It is obvious from the number of his surviving instruments, however, that Andreas Barth was no less successful in Munich. Both workshops passed on their knowledge to the succeeding generations, either within the family or to apprentices from outside. Johann Georg Saurle's workshop was continued by Georg Lang in Munich, who was succeeded by Elias Böhm. Andreas Barth trained not only his own illegitimate son, Anton Betzenhammer, but also Dominicus Leicher, who later moved to Augsburg. All these names occur in the list of makers in Table 2, along with brief biographies.

Map 1
Map of present-day Germany, showing regions and cities where instruments with reversed valve order were built, and the total number of such instruments built in each city.

Types of instruments and their pitches

The valve order semitone first, whole-tone second is found in many different kinds of instruments. Chronological distribution according to type of instrument is shown in Chart 3a. Ninety-one trumpet-type instruments were counted, making this the largest sub-group of such instruments. There are some early instruments whose exact classification—trumpet or cornet—is uncertain; to simplify matters, such instruments have been counted as trumpets here. The next largest group comprises cornets and cornopeans, totaling twenty-two instruments, and including two echo cornets and two circular cornets. Horns, fluegelhorns, a soprano saxhorn, alto and tenor horns, baritones, tubas, bombardons, a helicon, trombones, and a valve ophicleide are also present. Chart 3a shows that trumpets and horns peaked during the 1830s, while most of the cornets and cornopeans were constructed in the 1850s.

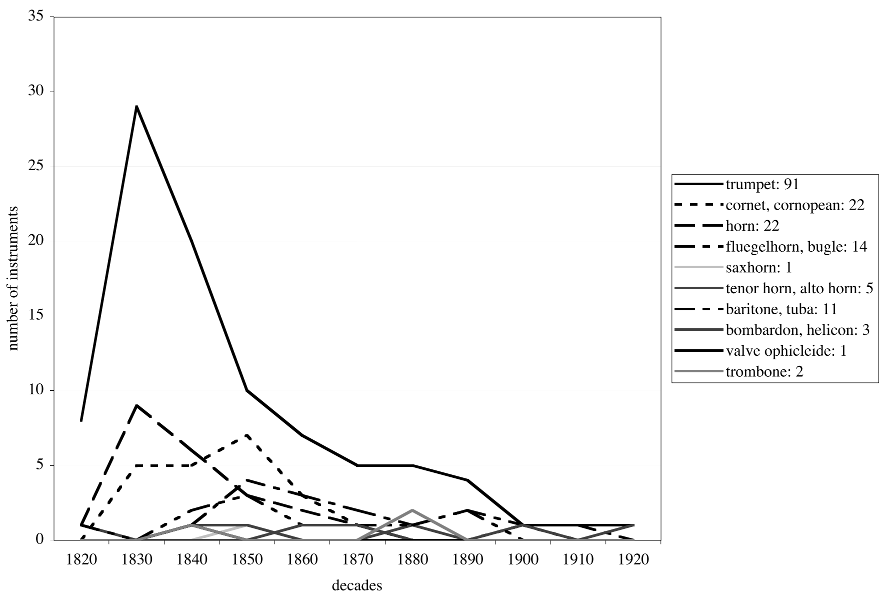


Chart 3a

Chronological distribution according to type of instrument.

By far the most common pitch among cornets and cornopeans is $4^1/_2$-ft. B♭. Some instruments combine the $4^1/_2$-ft. B♭ pitch with crooks for 4-ft. C, A, A♭, G, and/or 6-ft. F. Two Stölzel-valve cornets are in 4-ft. C and two American soprano cornets are in $3^1/_4$-ft. E♭. Trumpet pitches show a more multifaceted picture, as can be seen in Chart 3b.[7]

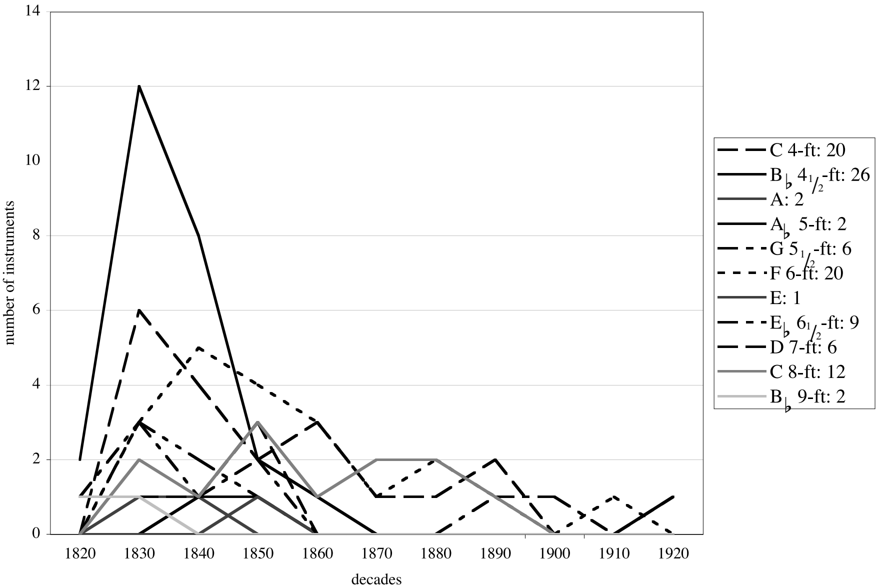


Chart 3b
Pitches of first-valve-semitone trumpets.

Trumpets in the pitch of 4½-ft. B♭[8] constitute the majority, with the greatest number from the 1830s, followed by the pitches 4-ft. C and 6-ft. F, culminating in the 1830s and the 1840s respectively. The pitch of 5½-ft. G is also most frequently found in the 1830s and the pitch of 7-ft. D in the 1840s and 1850s; 6½-ft. E♭ trumpets are found from the 1820s through 1900. The pitches A and E occur only in a collection of crooks.

Valve types

The following common valve types are found on these instruments: double-piston valves, rotary valves and string-operated rotary valves, Stölzel valves, Berlin valves, box valves, disc valves, and Périnet valves. In addition, some special constructions are found. Chart 4a shows their chronological distribution.

Special types

Before discussing the most important valve types used in instruments with reversed valve order, a few special constructions should be considered. The earliest dated instrument with the semitone valve first, by Adams, shows a valve type called "twin-vane valves" by Eliason.[9] Its unique characteristic is that the valve loop is directly linked to the side of the main

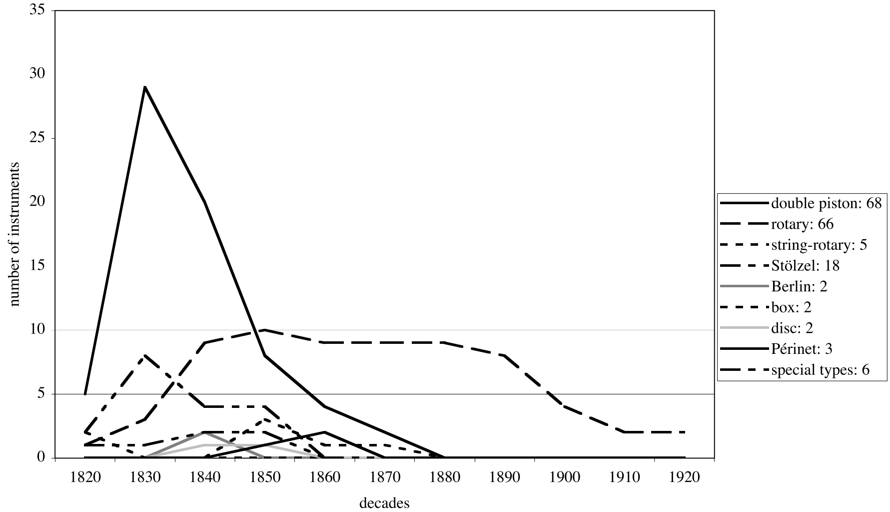


Chart 4a
Valve types

windway. Shutters or vanes within the windway direct the airflow. The two-armed levers, pivoted in saddles, are very reminiscent of the keys on keyed trumpets and bugles. The Hirsbrunner bass trumpet HMB 1980.2069. shows a precursor of the Samson valve, in which the piston runs in the windway as well, and is therefore not unlike the Adams concept.[10]

The trumpet by John August Köhler in New York's Metropolitan Museum of Art (89.4.2532) has an early type of swivel valve, which was invented by John Shaw. It must be turned by hand, but does not offer the assistance of a mechanical lever.

The experimental valve constructions seen in two cornopeans by Robert Bradshaw differ slightly from each other. The earlier one in the Brussels Musical Instrument Museum has elliptical pistons, while the later one in the collection of John Webb has round pistons, their circumference approximately midway in size between Périnet and Berlin valves. A singular feature of both instruments is a serpentine windway through the valves, which is intended to provide a free airflow when the valves are in use.[11]

Périnet valves

Only three instruments in Table 1 have Périnet valves: an alto/tenor horn with two valves at the Lititz Historical Society in Pennsylvania, presumably of American make, a cornet by Gautrot with top-sprung Périnet valves with detachable balusters (Figure 11), and an unsigned B♭ cornet of either French or Saxon provenance in the Grünwald collection.

Figure 11
Cornet in B♭ by Gautrot, Paris, ca. 1855/60 (M Stadtmuseum, 9-357).

Disc valves

The Köhler disc valve trumpet at The Metropolitan Museum (89.4.2531) represents a very early form in which the valves are still operated by hand with the help of levers; there is no automatic return. This type of valve is thus similar to the swivel valves on the instrument in the same collection.

Just one cornopean by John August Köhler with the later, more standardized version of the disc valve was found to be in reversed order. It has the return spring in a slender tube, surrounding the touch-piece push-rod, instead of having a clock-spring next to the disc, as was the case on the models Köhler presented at the Great Exhibition in London in 1851. Köhler's French horn, depicted in the 1851 catalogue of the Great Exhibition, also shows the reversed order (Figure 12). However, the overwhelming majority of Köhler disc-valve cornopeans and trumpets around 1855 have the normal valve order.

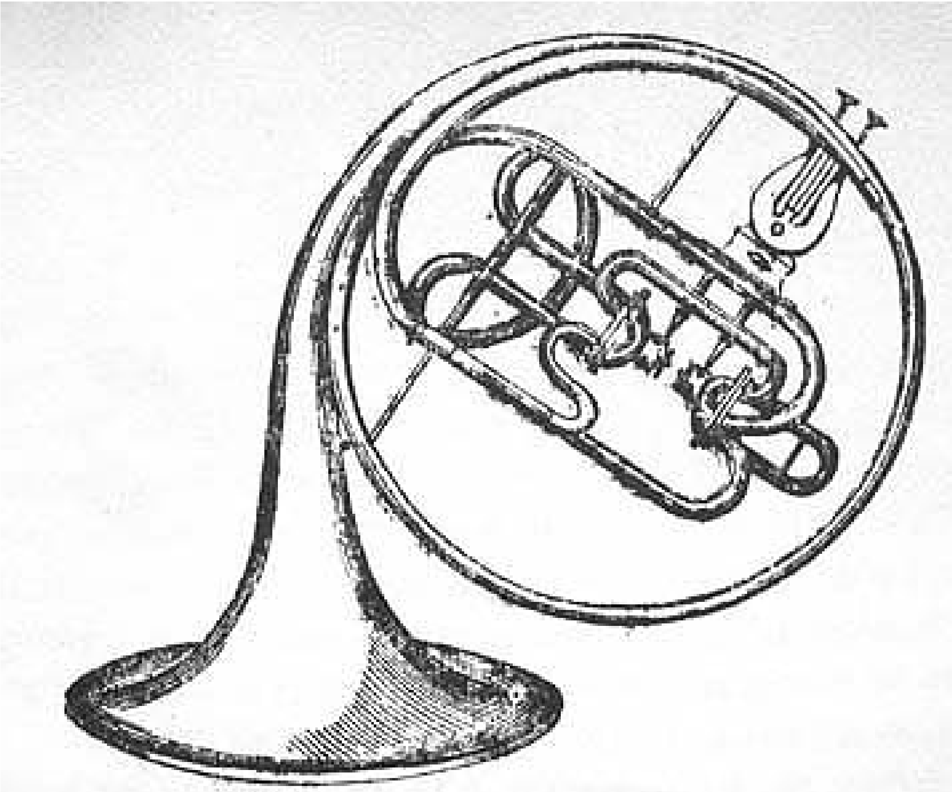


FIG. 8.—PATENT LEVER FRENCH HORN.

Figure 12
Horn with two disc valves in reversed order by Köhler, London.
Illustration from *The Crystal Palace and its Contents; an Illustrated Cyclopædia of the Great Exhibition of the Industry of All Nations*
(London: W.M. Clark, 1851-52), 286.

Box valves

The two box-valve trumpets in the list were built by the Karlsruhe maker Friedrich Wilhelm Schuster, presumably around 1825. According to François-Joseph Fétis, Schuster learned of the new valve inventions in Berlin by Friedrich Stölzel and Friedrich Blühmel around 1815 through a court horn player in Karlsruhe, Christoph Schuncke, who traveled to Berlin.[12] In terms of chronology and personal contacts, as well as the construction of his valve, Schuster is the maker closest to the originators of the valve. His box valve seems to be an immediate derivation of Blühmel's construction, even as concerns the valve order.[13] The early date of these instruments is also apparent from the lack of valve slides (Figure 13).

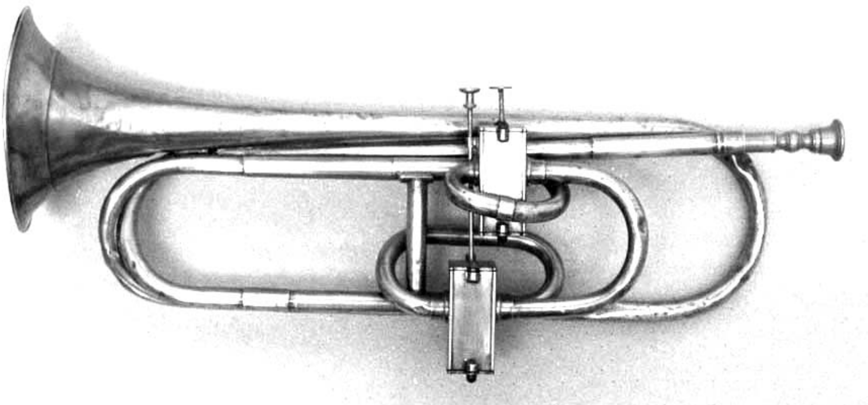


Figure 13
Trumpet in E♭ by Friedrich Wilhelm Schuster, Karlsruhe, ca.1825
(GNM, MIR 130).

On both of Schuster's trumpets the valve mechanism was designed to be detachable and could be exchanged with internal crooks. None of these crooks have survived, but the transitional stage between *Inventionstrompete* and valve trumpet is obvious.

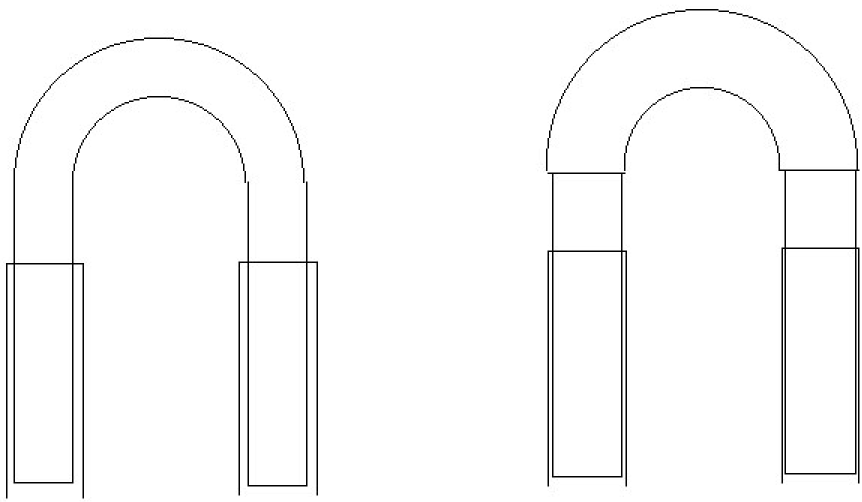
Stölzel valves

Derivations of the other early valve type, the so-called Stölzel valve, developed by Friedrich Stölzel in late 1814, are represented by eighteen instruments. Their most singular characteristic is that the main tubing enters from and leaves the valves at the bottom. While it is not surprising to find Blühmel-type box-valve instruments with reversed valve order, since he used it himself, it is somewhat surprising to find so many Stölzel-valve instruments with this configuration, since Stölzel designed instruments in the first-valve whole-tone arrangement.

The two earliest instruments with Stölzel valves, probably dating from ca. 1825, are in the St. Petersburg Collection of Musical Instruments.[14] The alto/tenor horn is signed by the St. Petersburg court instrument maker Ch. G. Tranzschel, while the baritone is unsigned. There are no valve slides present, just fixed loops. Both instruments have the older version of the Stölzel valve construction, with a horizontal screw aligning the piston and stopping the spring's motion. According to Heyde this valve construction might be similar to Friedrich Stölzel's original invention. All seven instruments in the list for which this construction can be identified[15] were built before 1842.

The provenance of these instruments is quite varied: they come from Belgium, Germany, Ireland, and Russia. The Metzler/Corcoran cornopean in the Edinburgh Collection shows both London and Dublin in its signature, but its features, particularly the floral embellishments in the form of oak leaves on the bell, hint at an origin in Saxony, probably Markneukirchen; the two cities mentioned in the signature, then, most likely are only of places of retail. The German origin of this cornopean is confirmed by the markings on the B♭ shank, "B," and the E♭ crook, "Es," the German nomenclature for these notes.

Two very early Stölzel-valve cornopeans in the Brussels museum are signed by Charles Joseph Sax, Brussels. They were built after 1830, presumably in 1833 or 1834.[16] Both instruments have very simple valve slides, consisting not of a U-turn and separate inner slides, but only of simple U-bows without further refinement (Drawing 1).



Drawing 1
Valve slides in cornopeans of Charles Joseph Sax (left), compared to the later construction of moving inner slides, still in use today (right).

Ten instruments have the later Stölzel valve construction, in which the horizontal screw is omitted and the spring is enclosed in a barrel or capsule on top of the piston. Instruments of this type from the 1830s, '40s, and '50s have been identified. Of these, eight are from England, one is presumably from Markneukirchen, and one is from the workshop of Andreas Barth in Munich (Figure 14a, b). Exactly the same cornet model is depicted in a bilingual price list of Barth's son, Johann Baptist Barth (see Figure 44 below) and was also offered by Johann Georg Saurle in a price list from ca. 1854.[17]

Figure 14a, b

Cornet à piston in C by Andreas Barth, Munich, ca. 1855 (M Stadtmuseum, 9-689) (semitone valve slide missing).

Finally, an unsigned B♭ trumpet with two crooks for F and E♭ at the Deutsches Museum in Munich shows a somewhat unusual Stölzel valve construction (Figure 15). The return spring of the piston is enclosed in a little separate tube, which is topped by the touch-pieces. Christian Häfelen-Schenk (1805-75) in Berne used a similar construction, so this trumpet may be Swiss.[18]

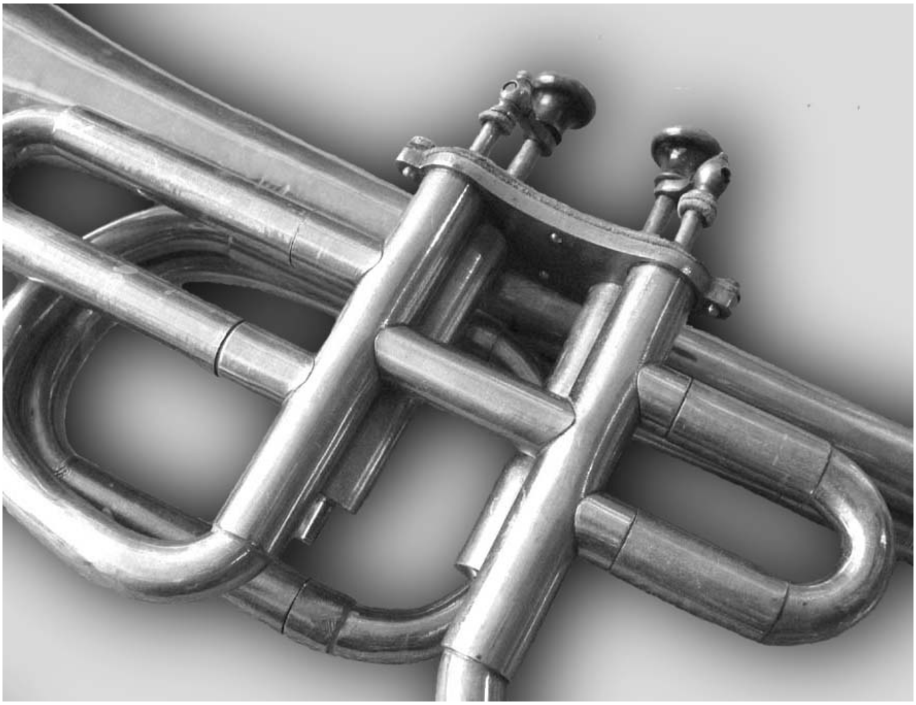


Figure 15
Valves of an unsigned trumpet in B♭, F, and E♭, Switzerland(?), ca. 1830 (DM, 16797). Return springs in separate tubes.

Berlin valves

Only two instruments with reversed valve order have Berlin valves, rather large piston valves in which the "in" and "out" of the valve loops are arranged on one level, rather than on different levels, as in Périnet valves. Herbert Heyde attributed the unsigned horn with Berlin valves in the Händel-Haus, Halle, to Emanuel Lorenz of Braunschweig. If this is correct, it is one of only two instruments with reversed valve order from north Germany. The Berlin-valve trumpet in B♭ in Table 1 is unsigned as well; it might be from Saxony, presumably from the Markneukirchen area, judging from the engraved decoration on the garland (Figure 16).

Double-piston valves

The most important valve construction found in early instruments with reversed valve order is the double-piston valve. In this valve type the simultaneous movement of two pistons introduces an additional valve loop or tube length (Drawing 2). As outlined by Herbert Heyde, double-piston valves are first recorded in 1821 in an announcement in the *Allgemeine Musikalische Zeitung*, describing the valve trumpet by Christian Friedrich Sattler

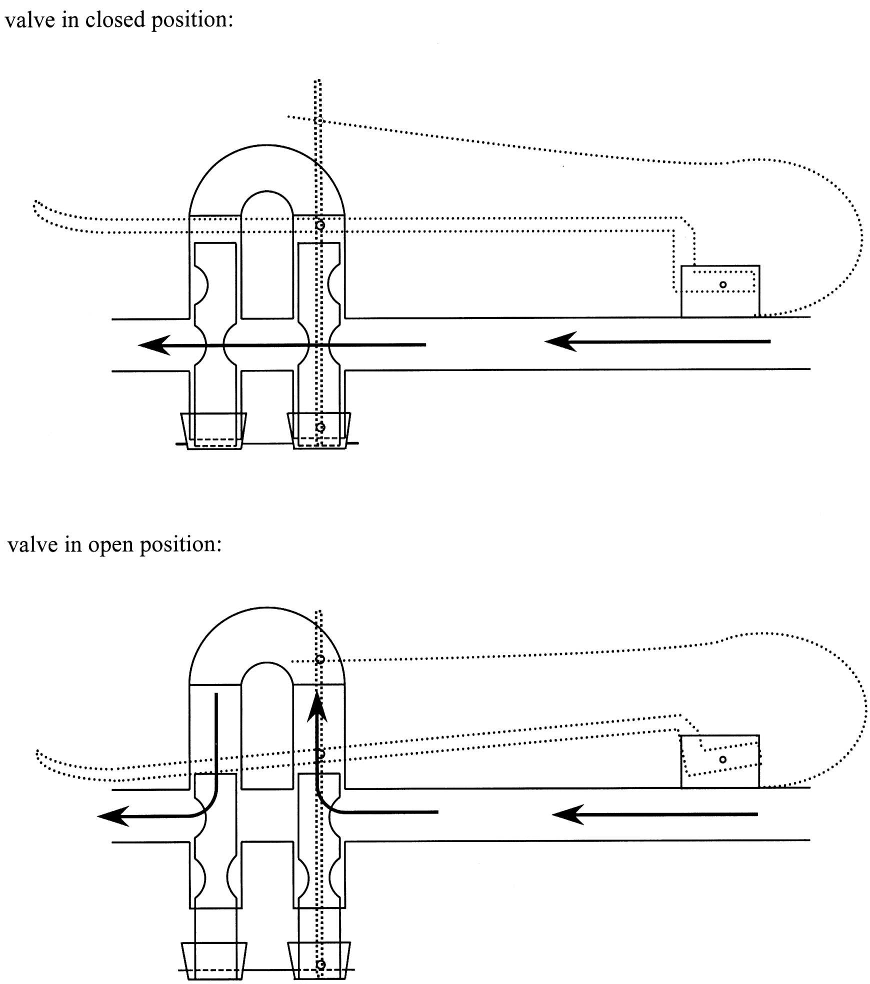
Figure 16
Unsigned trumpet in B♭, Saxony, probably Markneukirchen, ca. 1840
(Markneukrichen, 77).

(1778-1842) of Leipzig.[19] This valve type was further developed by Joseph Kail and Joseph Riedl in 1823, and later in 1830 by Leopold Uhlmann in Vienna. The latter used a similar construction still found on Viennese horns today, the so-called "Vienna valve." As will become clear in this section, this term is too restricted and is not really appropriate for the early stages of the development discussed here, which took place mostly outside Vienna, in other German-speaking areas. To add to the confusion, the term *Wiener Maschine* was used in Bavaria at this time for rotary valves, not for double-piston valves. Thus, use of the term "Vienna valve" for a double-piston valve in our context would obscure the historical situation.

As can be seen from Chart 4a, most of the instruments with double-piston valves date from the 1830s and '40s. The earliest dated European instrument on the list, the trumpet by Michael Saurle from 1828, has these valves. Their latest occurrence can be found in the 1860s and '70s on the instruments by Alois Gentner (Figure 1a, b). Chart 4b shows the distribution of the different types of double-piston valves in the decades from 1820 to 1860.

The earliest double-piston valve construction with reversed order is distinctly different from the modern "Vienna valve," particularly with respect to the operating mechanism. From the earliest instrument of 1828 until those of the 1840s, these valves were equipped with long levers and long return-springs.[20] This feature was used predominantly in Bavaria, but also in Switzerland. The majority of instruments with this characteristic date from the

1830s. Of twenty-nine such instruments, seventeen come from the Munich workshops of the Saurle family and Andreas Barth, two were built by Joseph Schneider in Regensburg, and one was made by Barth's pupil Dominicus Leicher in Augsburg. Five instruments come from the workshop of the Swiss family Hirsbrunner, as does probably one more instrument that is signed only with the initials *J.H.*, and finally, one was built by Christian Wilhelm



Drawing 2
Double-piston valve of the trumpet in B♭ by Andreas Barth, Munich, ca.1837 (Utley/NMM, 7058).

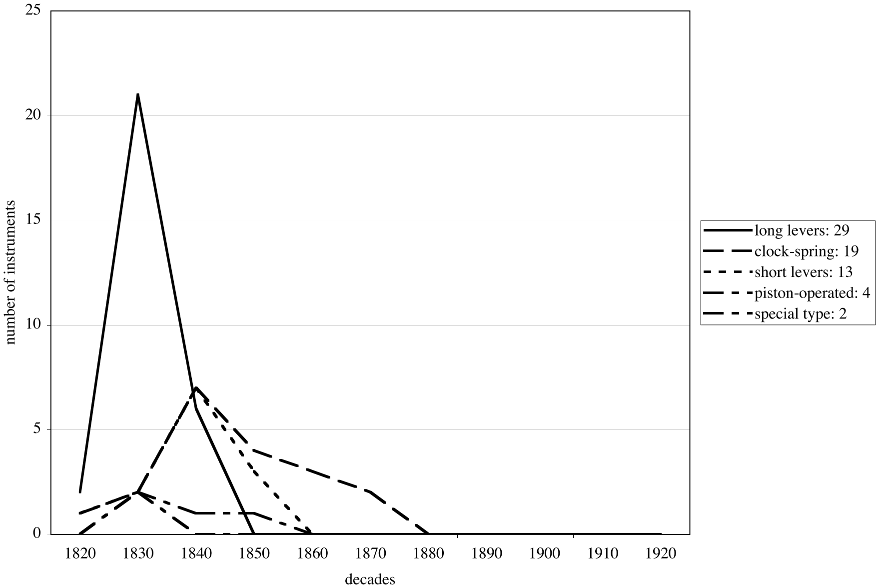


Chart 4b
Double-piston valve types and their chronological distribution.

Dürrschmidt in Adorf near Markneukirchen. All these instruments have just two valves, and almost all of them are trumpets, except for two very unusual horns. Both of the latter reveal an interesting construction of the first valve slide, which is square (Figure 17)—probably a sign of a rather early date; square valve loops are easier to build than small curved ones.

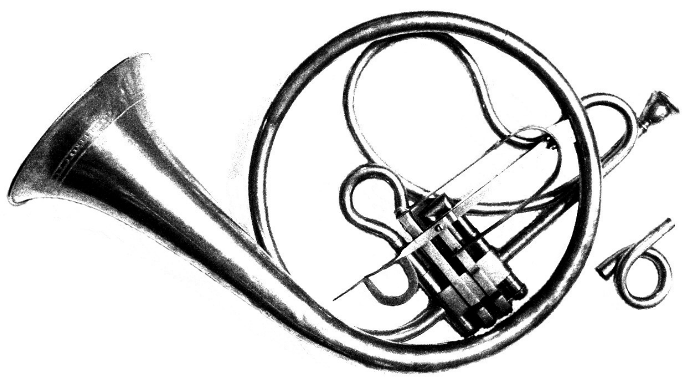


Figure 17
Horn by Hirsbrunner, Sumiswald, ca. 1830 (Burri, 587), with square first-valve slide.

Among these double-piston instruments with long levers, several different periods of construction can be distinguished. The earliest instruments, dated 1828, 1831, and 1832, from the workshop of Michael Saurle, have no first-valve slide, but simply a fixed valve loop. The valves are protected and covered by a broad brass strip, which is also where the date is engraved (Figure 8). The trumpet, signed *J.S.,* is constructed in such a way as to suggest that Johann Georg Saurle Sr. was the maker, because he is the oldest among the possible names with these initials, the others being Joseph Saurle and Joseph Schneider. However, not all of the early trumpets have just one slide. The Saurle trumpet in D at The Metropolitan Museum, dated 1829, has slides for both valves, as do two more early trumpets in 9-ft. B♭ by Andreas Barth from 1833 (Munich, Deutsches Museum, 44538) and his trumpet in F from 1834 (Nuremberg, Germanisches Nationalmuseum, MIR 131, Figure 18). The instruments with two valve slides were probably designed to play in different pitches, with the addition of crooks, while those with only one slide likely had no additional crooks.

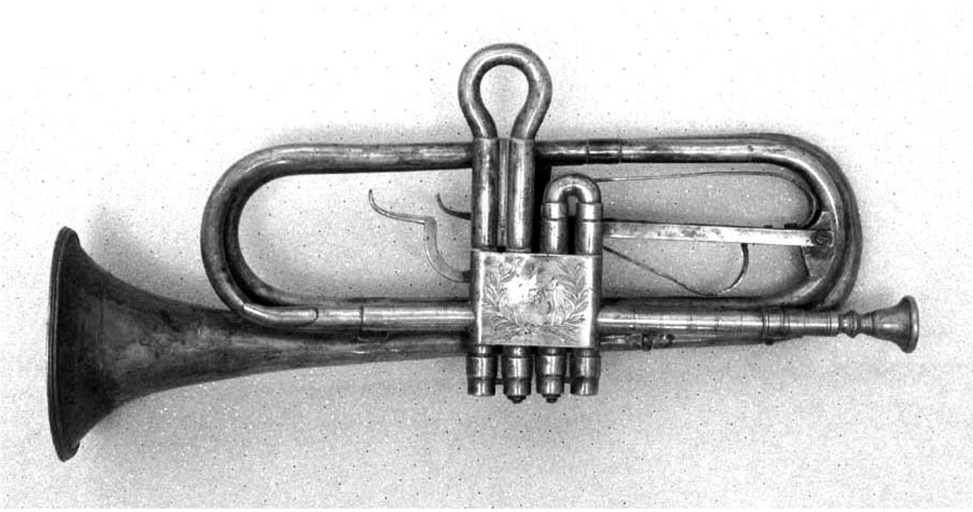


Figure 18
Trumpet in F by Andreas Barth, Munich, dated 1834 (GNM, MIR 131).

The Hirsbrunner trumpets have the same construction as the instruments just mentioned, that is, with protective sheet brass around the pistons, and with slides for both valves. In addition, the two earlier instruments in Burgdorf have terminal crooks, while the two later exemplars in Basel and Nuremberg have a peculiar main tuning slide, arranged perpendicular to the leadpipe (Figure 19).

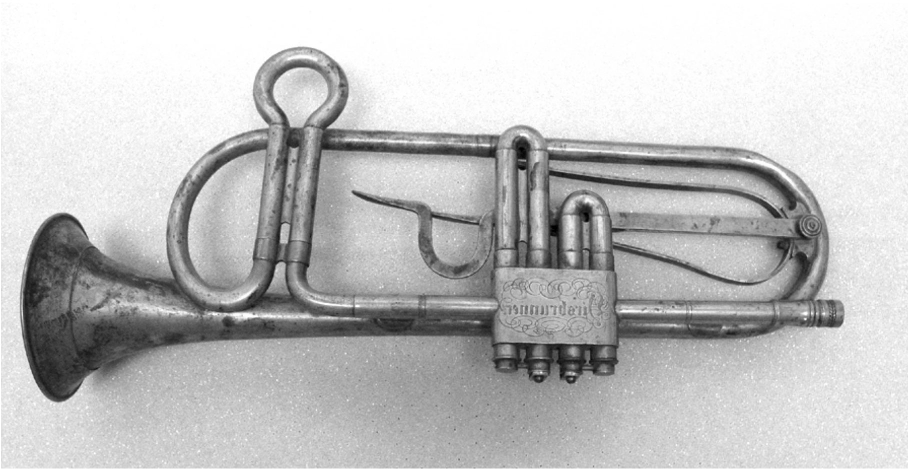


Figure 19
Trumpet in B♭ by Hirsbrunner, Sumiswald, ca.1835 (GNM, MIR 132), with main tuning slide perpendicular to the leadpipe.

A new design was achieved with the trumpet dated 1835 by Andreas Barth in the Institut für Volkskunde in Munich. This instrument differs from the older model principally in that the protective sheet brass surrounding the pistons has disappeared in favor of a rectangular passage through the valves. This design was also used by Michael Saurle until 1837 (Figure 20), and can be found in his undated trumpet in D (Munich, Bayerisches Nationalmuseum, MU 209); Johann Georg Saurle Sr. (Basel, Historisches Museum, 1956.597.) and Joseph Schneider of Regensburg (Bayerisches Nationalmuseum, MU 199)

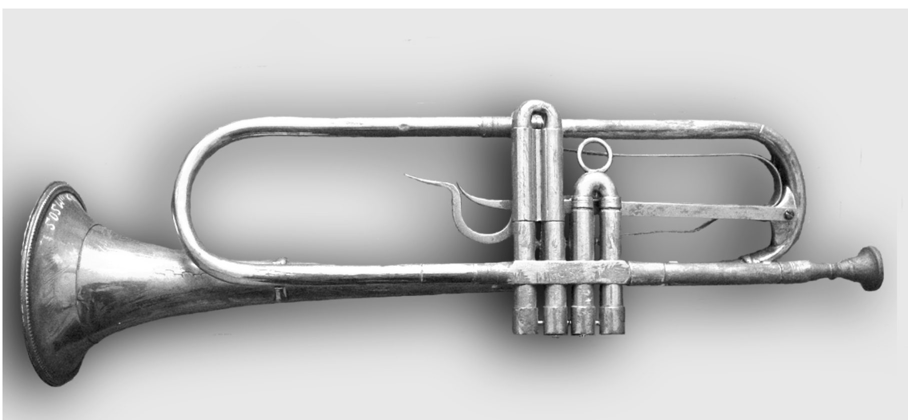


Figure 20
Trumpet in B♭ by Michael Saurle, Munich, dated 1837 (BNM, MU 202).

used the same construction. Schneider (Ingolstadt, 2695) later changed this feature to a round passage through the valves, as did Dominicus Leicher (Bad Säckingen, 14404).

After 1835 a final change took place in the double-piston valve construction with long levers, apparently in the Barth workshop.[21] All the instruments with double pistons and long levers mentioned so far have their levers pivoted with screws on a more or less clumsy-looking piece of brass at the bow opposite the bell (see Figures 18-20). Barth's novelty consists of a much more elegant construction of the axle bearing for the long levers—a saddle (Figure 3), the possible origins of which will be discussed below. The long return springs are screwed to the underside of the brass plate that stretches between the leadpipe and bell section to carry the saddle. The whole construction is quite graceful. In addition to Barth, his pupil Dominicus Leicher in Augsburg also used this construction on the instrument preserved in Bad Säckingen. The three presumably latest instruments with this construction are a Barth trumpet in 4-ft. C (Münchner Stadtmuseum 42-134) and two trumpets in F (Münchner Stadtmuseum 53-15, BNM MU 208), all having a main tuning slide, and probably dating from the 1840s.

No instrument by the Saurle family with this kind of axle bearing is known to the authors. The innovations of Barth's construction were minor compared to the step Johann Georg Saurle Sr. took in 1838. His trumpet in 4-ft. C (BNM MU 201, Figure 21) shows a clock-spring action instead of long levers.

It is likely that Saurle took over this device from Leopold Uhlmann in Vienna, either from information in Uhlmann's patent from 1830, which had expired in 1835, or by studying Uhlmann's instruments. Saurle obviously attempted to copy Uhlmann as closely as possible, though he apparently either did not quite understand or did not care about

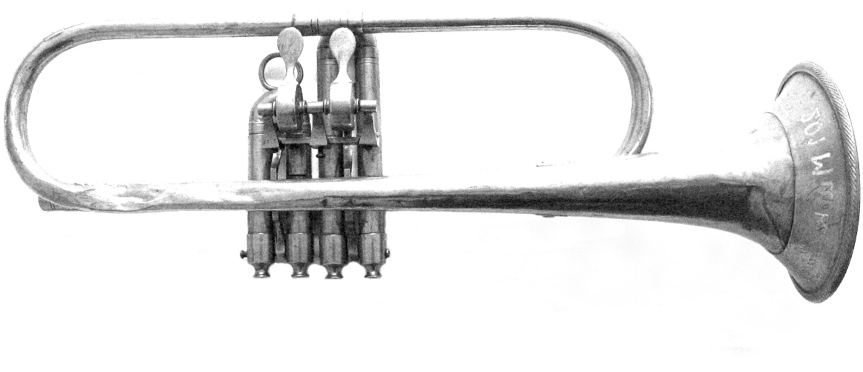


Figure 21
Trumpet in C by Georg Saurle Sr., Munich, dated 1838 (BNM, MU 201); double-piston valves with clock-spring action.

certain constructional details. The ends of the Bavarian double-piston valves consist of simple, slightly overlapping caps, usually with a small cork-ring padding inside the cap to reduce noise at the return of the piston. Uhlmann's piston ends, on the other hand, had a sophisticated system of interlocking cork buffers with tapering ends. Saurle copied only the latter feature, the tapering end, while keeping the principle of overlapping caps. Georg Saurle's father Michael Saurle used exactly the same cap ends in connection with a clock-spring action in his valve ophicleide from ca. 1840 (Leipzig, 1767). In fact, it was most likely he who introduced this new system to the Saurle workshops, not his son.[22] In a hand-written postscript to a price list by Michael Saurle Sr., dated by Tremmel between 1826 and 1840, one finds the following remark:

> Chromatische Instrumente mit Vendille, wo die Maschine anstatt der langen Höble, oder Klappen mit Federhäuschen versehen, und so die Vendille Dirigiert werden, welches bey dene vorne angezeigten Chromatischen Instrumenten bemerkt werden muß. Ob selbe auf die Art gemacht werden sollen, der Kosten ist nicht mehr.[23]

> Chromatic instruments with valves, wherein instead of long levers or keys the mechanism shall be equipped with a clock-spring, and the valves operated by them, should be stipulated [when ordering] the chromatic instruments mentioned above. When they are made in this manner, the cost is not higher.

Thus at a certain point in time between 1826 and 1840—presumably closer to the latter date—the customer had the choice between the old method and the new method when ordering from the Saurle workshop. The change from the double-piston valve of the old form with long levers to the new clock-spring-operated mechanism was not just a change of construction; it was also of great significance to the way these instruments were played. The trumpet was held vertically with the loop above the bell as long as it had the long levers. With the clock-spring action it was suddenly held horizontally, like a rotary-valve instrument. This must have met with some resistance on the part of the musicians. It was therefore important to leave the choice of construction open to the customer, as Michael Saurle did. So far, no records of such a reluctance to introduce the clock-spring in Bavaria have been found. However, the continuous use of the long levers at least until after 1840, as documented for example on the trumpet by Dominicus Leicher in Bad Säckingen, might be a hint that a certain conservatism played a role in players' late acceptance of the clock-spring in Bavaria.

Later other Bavarian makers, such as Dominicus Leicher and Alois Gentner, also built instruments with the clock-spring return, but kept the overlapping caps without taper at the piston ends (Figure 1b). This construction was used up to the 1860s. Only one double-piston valve trumpet in 4-ft. C by Andreas Barth shows the real Uhlmann system of interlocking cork parts (Münchner Stadtmuseum, 79-38, Figure 22); this is a sign that it must have been built later in the 1840s—probably around 1845, before Barth changed to