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# The rise of the "family principle" of instrument building

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Organologists have generally regarded the years ca. 1500 as the advent of the concept of building instruments in families – that is, in sets made up of multiple sizes imitating the different registers of the human voice and designed to perform polyphony inspired by vocal models. Such a perception is certainly understandable, since it is first from the early 16th century that we have explicit information regarding instrument sizes and tunings. It is from this period, too, that we see the first evidence of the craze for both inventing new families of instruments and expanding the number of sizes within existing ones – a craze that produced the huge variety of instruments that have come to characterize the music of the 16th century. Witness, for instance, the developments that took place between Sebastian Virdung's *Musica getutscht* (Basel, 1511) and Michael Praetorius's *Syntagma musicum*, Vol. 2 (Wolfenbüttel, 1619). Virdung illustrates a small number of wind families – two and two-thirds, to be exact[1] – and no string families, while for Praetorius the number of wind families has grown to some fifteen, and there are in addition at least three families of strings. As we know, however, no major cultural shift in direction takes place overnight, and in fact we can trace the roots of the "family principle" of instrument building as far back as the 14th century. While much of the story concerns wind instruments, the issues involved bear considerable relevance to the development of the viol family, since they speak to the question of the mindset of those developing and playing the earliest viols.

1 Virdung shows three sizes of recorder, four sizes (apparently) of crumhorn, but only two sizes of shawm; see Herbert W. Myers, "The idea of 'consort' in the sixteenth century", in: David Lasocki (ed.), *Musicque de Joye: proceedings of the international symposium on the renaissance flute and recorder consort, Utrecht 2003*, Utrecht: STIMU 2005, 31–60: 32 and 54 (n. 4).

## The shawm family: issues of terminology

The first evidence of the creation of a family of instruments based upon the capabilities of the human voice concerns the shawm – a fact we may find somewhat paradoxical, since the shawm is not an instrument whose characteristics we generally associate with the voice! The early terminology sometimes used to distinguish the instruments of the loud band might easily mislead us into thinking the shawms were not viewed as a family at the time. The French, for instance, often referred to the treble shawm specifically as the *chalemie*, using the word *bombarde* to designate the keyed, lower-pitched instrument that had been developed in the 14th century to play tenor to the *chalemie*'s *cantus*.[2] German writers employed similar terminology: *Schalmei* and *Bombardt* (or *Bomhart*), the latter word eventually becoming corrupted, through suppression of the unaccented second syllable, to *Pommer*. The distinction was long maintained in Germany, causing Praetorius, who clearly thought of the *Schalmeien* and *Pommern* as constituting a single family, to have to explain that only the highest, keyless *Discant* of the family was called a *Schalmei*.[3] (It should be understood that for Praetorius the original tenor

2 *Chalemie* – along with its cognates in other European languages (German *Schalmei*, Netherlandic *scalmey*, English "shawm", Italian *ciaramella* or *cennamella*, Spanish *chirimía*) – descends from Latin *calamus* (pipe). The etymology of *bombarde* as a musical term is slightly less straightforward. It seems certain that the instrument name was adopted from that for the artillery bombard; the question is, why? The ultimate origin of the word appears to be Latin *bombus* (rumbling; buzzing; humming; booming), and that derivation certainly makes sense as a name for a cannon; it makes little sense, however, for the comparatively high-pitched woodwind to which the name was given in the 14th century. I believe we should look to visual rather than aural imagery for an answer here. The protective barrel (*fontanelle*) over the key mechanism of the instrument bears considerable resemblance to the reinforcing bands of the full-size cannon, and there is an even more remarkable similarity between some representations of the instrument and the smaller "hand bombards" or "hand cannons". For an extant example of a hand bombard, see https://commons.wikimedia.org/wiki/File%3AHandBombardWesternEurope1390–1400.jpg (6 February 2019).

3 Michael Praetorius, *Syntagma Musicum. Vol. 2: De Organographia,* Wolfenbüttel: Elias Holwein 1619, 37. In using the singular ("Allein der oberste Discant") in this explanation, Praetorius was obviously overlooking the *Exilent* or *gar klein Schalmey*, which he

instrument had become an alto [*AltPommer*], the family having by then grown to include six sizes, from *Exilent* [sopranino] down to *GroßBaß*. Most modern English-speaking shawm players would also call this member of the family an "alto", even though according to traditional English usage, as found throughout the period of its original use, it would have been called a "tenor". I shall continue to use the term "alto shawm" here, despite the anachronism, in order to avoid ambiguity.) Interestingly, the earliest mention of the *bombarde* as a musical instrument comes from a Germanic source: "Es sol nieman affter der dritten Wahtglocken in unser statt trumpeten oder bosunen one pfiffer, die da pfiffent mit schalmigen und bumhart, als das gewonlich ist [...]" (Strasbourg *Stadtrecht*, 1322, paragr. 454).[4]

It is worth noting that a distinction in names between instruments that otherwise have a certain affinity is typical of the Middle Ages. Besides the distinction between *chalemie* and *bombarde*, possibly the most significant example concerns the lute and the *Quintern* or gittern, which shared a similar method of tone production and were often paired in performance, but which differed in shape and construction. Another pair of instruments related by method of tone production was the rebec and vielle (*klein Geige* and *Vedel*), although the idea that they regularly played together is much less certain.

includes among the *Schalmeyen* both in his chart of ranges (ibid., [22]) and on Plate XI of his *Theatrum instrumentorum,* Wolfenbüttel: s. n. 1620.

4 See Stewart Carter, *The trombone in the renaissance: a history in pictures and documents*, Hillsdale, NY: Pendragon Press 2012 (Bucina: The Historic Brass Society Series 8), 76. As Carter points out, this citation pushes back by two decades the commonly accepted date for the first use of the word "bombard" (or one of its cognates) in a musical sense. This twenty-year gap should in fact be extended by at least another quarter-century. At issue is the dating of the conversation manual known as *Le livre des mestiers.* The long accepted date of ca. 1340 (often reported more specifically as 1342) has been challenged on the basis of numismatic evidence; see Philip Grierson, "The dates of the *Livre des mestiers* and its derivatives", in: *Revue belge de philologie et d'histoire* 35/3 (1957), 778–783: 779–781. Grierson shows that the work could not have been produced before 1367 at the earliest, although he does cite evidence – similarly numismatic, but much less definitive – suggesting that a primitive version stemming from the first decade of the century might once have existed. (I am grateful to Keith Polk for having drawn my attention to Grierson's article.)

While German writers continued to maintain the distinction between *Schalmei* and *Bombardt* (or *Pommer*), French writers began about 1500 to refer to the shawms collectively as *hautbois* – literally "high woods" (meaning, of course, "loud wood*winds*"). But there are many indications from even earlier that these loud reeds were viewed as belonging to a single type, despite the different names. Perhaps this reference from the Burgundian accounts from 1453 says it all: mentioned is "une chalemie appelée bombarde" – "a shawm called a bombard".[5] There are a number of indications from both French and German accounts that show these words (particularly *chalemie* and *Schalmei*) were often used in a collective or generic sense,[6] and the usage in other languages (English, Netherlandic, Italian, and Spanish) was even more often generic. Also clearly inclusive were some alternative terms commonly used to refer to the shawm: "waits pipe" in English, *instrument des ménestrels* (minstrels' instrument) in French, and *piffaro* or *piffera* (pipe) in Italian. These expressions, as with German *Pfeiffer* and Netherlandic *pijper*, are far more often found in forms indicating *players* of the shawm rather than the instrument itself: "waits", *ménestrels* (or *ménestriers*), *piffari.*

Nowadays we have a similar ambivalence in our terminology for certain instruments; while, for instance, we distinguish the violin, the viola, and the cello as separate items, at the same time we also recognize the "violin family" as an entity. I suspect, however, that there is something slightly more significant behind the early distinction between *chalemie* and *bombarde*, in that the physical difference went beyond that necessary for the difference in pitch. Besides the obvious difference occasioned by the presence or absence of a key (with its protective barrel or *fontanelle*), there is a notable difference in the layout and acoustical design of the two instruments. As seen in extant exam-

5 Victor Gay, *Glossaire archéologique du Moyen Age et de la Renaissance*, Paris: Société bibliographique 1887–1928, Vol. 1, 173.

6 A significant example is the well-known account (by Olivier de la Marche) of the festivities for the marriage of Charles the Bold in 1468, during which three *scalmayes* joined a *trompette saicqueboute* to play a motet; it is inconceivable that the shawms were all of the same size, so at least one of them must have been a *bombarde.* For a transliteration of the account see John Frederick Randall Stainer and Cecie Stainer, *Dufay and his contemporaries*, London: Novello and Company 1898, 16.

ples[7] (none of them dating from before the 16th century, unfortunately), the fingerholes of the *chalemie* lie in the upper half of its body, while those of the *bombarde* are more spread out – another way of saying that the higher-pitched instrument has a proportionately longer bell extension. (For 16th-century examples of treble and alto shawms, see Figure 1). The treble and alto shawms are thus closer in length than their difference in pitch (a fifth) would dictate. The bell extension of the treble is not "just for show"; again, judging from extant examples, we find that it serves to stabilize certain important notes.[8] But to have built a precisely analogous instrument a fifth lower in pitch would undoubtedly have resulted in an impractically long design. Differing musical priorities also account for divergences in fingering between the two instruments.[9]

7 Examples of 16th- and 17th-century treble and alto shawms are to be found in Vienna (Kunsthistorisches Museum, Sammlung alter Musikinstrumente: one treble, three altos), Brussels (Musical Instruments Museum: five trebles, two altos), Salamanca (Salamanca Cathedral: two trebles, four altos) and Prague (National Museum, Czech Museum of Music, Musical Instrument Museum: one alto).

8 Experiments with surviving treble shawms (as well as copies of them) show that the behaviour of the third note (counting from the bottom) and its octave are particularly affected by the arrangements of the resonance holes in the bell section, in that their sizes and positions seem to have been carefully selected to render the note bistable – that is, stable at two pitches a semitone apart. If the instrument is considered to be in (7-fingers) *g*, as it was in the early 16th century and thus probably in the 15th as well, the notes affected would be B♭ and B in both octaves – both pitch classes indispensable constituents of *musica vera*.

9 Here perhaps the most significant difference concerns the fingerings for the fourth note from the bottom (*c′* on the treble, *f* on the alto considered as an instrument in C). Again, judging from extant examples, we find that the treble shawm requires a "forked" fingering (123/4-6-), while the analogous note on the alto has a "plain" fingering (123/4---). This fingering pattern on the treble affords a very stable *c′* as well as a *c♯′* – both important notes to have available on an instrument playing a *superius* part. Experiments with tuning replica altos reveal that it is difficult to achieve the same stability on them with a forked-fingered *f* (probably because of the size of its fingerholes, which are smaller than those on the treble); evidently it was more important to have a solid *f* (at the expense of an easily produced *f♯*) on an instrument meant for playing tenor parts.

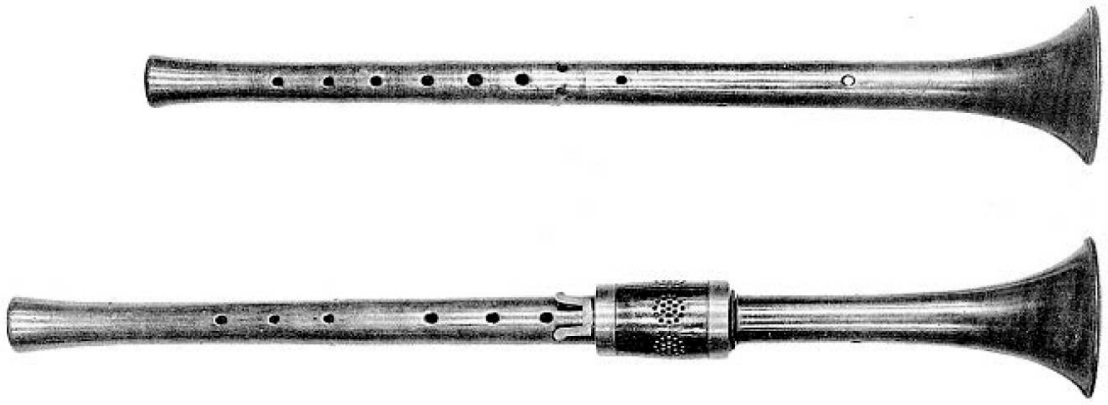


Figure 1: Treble and alto shawms in the Kunsthistorisches Museum, Vienna, Sammlung alter Musikinstrumente: SAM 179 (anonymous) and SAM 182 (Hans Rauch von Schrattenbach). Reproduction from: J. von Schlosser: *Die Sammlung alter Musikinstrumente. Beschreibendes Verzeichnis*, 1920 (reprint 1984), Table 37.

The developed treble shawm thus represents a marvel of engineering – one all the more remarkable when we consider that on it the same chromatic capabilities as those found on the Baroque oboe were achieved completely without the use of keys. Just how early the development might have taken place is still a question; I suspect it might have been as early as the beginning of the 15th century, since there are paintings from the first half of the century that attest to the difference in layout that we have observed in the surviving 16th-century examples.[10]

10 Perhaps the clearest evidence is to be found in the two depictions of a shawm band in Leonardo da Besozzo, *Coronation of the Virgin*, Church of San Giovanni a Carbonara, Naples (ca. 1440); see Herbert Myers, "Evidence of the emerging trombone in the late 15th century: what iconography may be trying to tell us", in: *Historic Brass Society Journal* 17 (2005), 7–35: 16–17 (Figures 11 and 12). Executed about a decade earlier was the painting known variously as *The hunt of Philip the Good*, *The marriage of Philip the Good and Isabella of Portugal*, and *Garden party at the court of Philip the Good of Burgundy* (among other titles). Often ascribed to Jan van Eyck or his school, the painting was destroyed in 1608 and is known only from copies (one from the 16th century in Versailles [Musée National du Château, Inv. no. MV 5423] and one from the 17th in Dijon [Musée des Beaux-Arts, Inv. no. 3981]). Here the length of the bell of the treble shawm has been exaggerated, making the treble appear longer than the *bombarde* next to it. For a colour reproduction of the Versailles copy, see Edmund A. Bowles, *Musikleben im 15. Jahrhun-*

## The *contre* problem

Another unanswered question concerns the nature of a third kind of shawm, known as the *contre*. This instrument was mentioned in a well-known Burgundian account-book entry of 1423: in that year Pierre de Prost, instrument maker of Bruges, was paid for a set of five instruments, "two called keyed *bombardes*, one *contre*, and two *chalemies*".[11] The most obvious interpretation would be that the *contre* represented a third size of shawm – one built a fifth below the *bombarde* serving as tenor, following the pattern of later practice.[12] Such an interpretation would seem to have the support of Johannes Tinctoris, whose description of the shawms in a treatise from ca. 1482 suggests they came in three physically different sizes: "*suprema*, ten-

*dert*, Leipzig: VEB Deutscher Verlag für Musik (*Musikgeschichte in Bildern*, Band 3: *Musik des Mittelalters und der Renaissance*/Lieferung 8), Fig. 75; for a scan of the Dijon version, along with alternative theories as to the topic, dating and creator of the original, see https://beaux-arts.dijon.fr/sites/default/files/Collections/pdf/une_fete_champetre_a_la_cour_de_bourgogne.pdf (7 February 2019).

11 See Jeanne Marix, *Histoire de la musique et des musiciens de la cour de Bourgogne sous le règne de Philippe le Bon (1420–1467)*, Strasbourg: Heitz et Co. 1939, 102–103. This reference is clearly to a type of instrument. Less clear in this regard is the record from 1406 of a German (Nicolò d'Allemagna) hired to play *ceremella contra tenorem* in the Florentine shawm band; here the reference may be instead to the musical role of the player rather than to his instrument. See Keith Polk, *German instrumental music of the late middle ages: players, patrons and performance practice*, Cambridge: Cambridge University Press 1992, 53.

12 According to Praetorius (*Syntagma* II, 36) such an instrument, equivalent to his *Tenor-* or *BassetPommer*, but without its lower extensions below the 7-finger note, was known as a *Nicolo*. Two instruments of this description have survived, both in Prague (Musical Instrument Museum, nos. 474E and 482E). Instruments of this type apparently remained rare during the period of the shawm's use. We have seen, for instance, that Virdung fails to mention a third size of shawm (see n. 1), and Martin Agricola similarly did not find it worth including in his composite fingering charts for woodwinds (*Musica instrumentalis deudsch*, Wittenberg: Georg Rhaw 1529, fols. 9r, 9v and 10r; and *Musica instrumentalis deudsch*, Wittenberg: Georg Rhaw 1545, fols. 20r, 21r and 22r), even though it would have cost him very little effort or ink to have done so.

or (commonly called *bombarde*), and contratenor".[13] But 1423 seems like an improbably early date for an instrument to be needed to play a *contratenor bassus*. To be sure, Guillaume Dufay had begun to compose *chansons* with a *contratenor bassus* in the 1430s, *Se la face ay pale* being a particularly notable – and influential – example.[14] But if we examine collections of *chansons*, we find that rather few low contratenor parts are found in them before the last quarter of the century. The music manuscript El Escorial IV.a.24 (more commonly known as Escorial B or *EscB*) may serve as a typical example from just after the mid-century; of some 122 *chansons* contained in it, only 14 have low contratenor parts, and most of those are found near the end of the manuscript (suggesting they were added near the end of the period during which it was produced – probably near 1460).[15] These statistics suggest there would have been little pressure to build a size of instrument capable of playing in the lower range before 1460 or so. Basing our reasoning here on the stylistic traits of surviving composed polyphony is dangerous, of course, since we know that one of the primary responsibilities of the loud band involved improvisation – particularly of dance music, the nature of which we can only guess at. But it is also difficult to imagine the members of an *alta* band being far in advance of the greatest composers of the age in their basic compositional style. There is, however, some iconographic evidence to support the theory that the *contre* mentioned in 1423 was a larger size of shawm

13 For transcription of the original Latin text of the sections on instruments, along with an English translation, see Anthony Baines, "Fifteenth-century instruments in Tinctoris's *De inventione et usu musicae*", in: *Galpin Society Journal* 3 (1950), 19–26: 20–21. The surviving section of the printed treatise carries no date; for a more recent discussion of the dating (revising it from "about 1487" to "between 1481 and 1483") see Ronald Woodley, "The printing and scope of Tinctoris's fragmentary treatise *De inventione et usuv musice*", in: *Early Music History* 5 (1985), 239–268: 241–245.

14 See Kenneth Kreitner, "*Se la face ay pale* and the loud band of the fifteenth century", in: *Historic Brass Society Journal* 21 (2009), 1–10.

15 Concerning the dating of *EscB*, see David Fallows, *A catalogue of polyphonic songs, 1415–1480*, Oxford: Oxford University Press 1999, 15–16. Significantly, the version of *Se la face ay pale* in *EscB* presents a revised *contratenor* part, in which the range has been curtailed on the low end, making it conform to the range of the tenor. The alterations in this *contratenor* part are discussed by Kreitner, "*Se la face*" (see n. 14), 3.

than the normal *bombarde*; a small minority of 15th-century pictures do show shawms of an extraordinary length. One particularly clear example (an anonymous drawing, now in the Graphic Collection of the Universitätsbibliothek, Erlangen-Nürnberg; for a detail see Figure 2)[16] depicts a mounted *alta* band that appears to contain three sizes of shawm, the longest evidently over a metre in length; this drawing dates from the 1420s (and thus from roughly the same period as the Pierre de Prost reference cited above). While hardly conclusive, owing to their small number, such examples certainly constitute strong enough evidence to keep us from dismissing the theory out of hand. The only plausible alternative, I believe, is that the *contre* was an instrument of the same size as the normal *bombarde* but built to produce a contrasting timbre, either through having a different shape of bell[17] or different shape of bore. In any case, the issue remains a puzzle.

16 For a scan of the entire drawing, see http://digital.bib-bvb.de/webclient/DeliveryManager?custom_att_2=simple_viewer&pid=3037240 (6 February 2019). Somewhat less clear is a miniature illustrating a "Carole in the orchard" from the *Roman de la Rose* (? Master of the *Chronicle of Jean Juvénal des Ursins*, Paris, Bibliothèque nationale, Ms. fr. 19153, fol. 7, ca. 1460), appearing to show shawms of three different sizes; this example is reproduced in monochrome in Bowles, *Musikleben* (see n. 10), Fig. 44, and in colour in Robert Wangermée, *Flemish music*, New York: Frederick A. Praeger 1968, Plate 51.

17 For a discussion of instruments, both woodwind and brass, shown with barrel-shaped bells, see Ross Duffin, "Backward bells and barrel bells: some notes on the early history of loud instruments", in: *Historic Brass Society Journal* 9 (1997), 113–129. As he points out, depictions of shawms with both barrel bells and *fontanelles* are very rare. To the single example known to him (his Fig. 6, p. 119) can be added the Erlangen-Nürnberg drawing just cited (see Fig. 2 and n. 16) and the *Marriage feast of St. Julian and St. Basilissa*, Master of St. Basilissa, first half of the 15th century (Museum of Catalan Art, Barcelona). The latter is reproduced in François Lesure, *Music and art in society*, University Park and London: The Pennsylvania State University Press 1968, Plate 82; it is perhaps unique in showing a bombard with barrel bell alongside one of the same length with a flared bell.

**Figure 2:** Detail of *Tournament Scene, on the left: four mounted wind players*, ?Workshop of Giacomo Jaquerio, ca. 1420–1430. Erlangen, Graphic Collection of the University, H62/B 16.

## The brass instruments of the family: slide trumpet or trombone?

Further puzzles concern the brass instruments that were regularly – if not quite ubiquitously – mixed with the shawms in the 15th-century loud band. Scholarly discussion has been intense at times regarding the issue of the slide trumpet: that is, whether a trumpet equipped with a long mouthpiece extension or single slide preceded the trombone, an instrument defined by its double or U-slide.[18] While the existence of the slide trumpet in the 15th century cannot be proven, due to the nature of the available evidence, I believe the "slide trumpet theory" is still the best explanation for the facts as we know them. But the focus of more recent controversy has been on the trombone, although the question here, naturally, has been more "when" than "whether". The issue is crucial because of the limitations in range imposed by the single slide; the range of the slide trumpet is limited in the downward direction to basically that of the alto shawm. Some have suggested, based upon continuity of terminology, that an instrument equipped with a U-slide was available as early as the 1430s; certainly cognates of the word *trombone* were in use in Italy by 1437, soon followed by *trombone* itself.[19] Such linguistic evidence can, however, be misleading, as we know. During the same period, for instance, French writers in the Burgundian court were still referring to the brass instrument that played with the shawms as a form of trumpet (specifically the *trompette des menestrelz*); the expression *saqueboute* (or sometimes *trompette saicqueboute*) dates from somewhat later (beginning in the 1460s, that is).[20] The German word *prusunen* (or *prusonen*) – an early form of *Posaunen* – appeared early in the century (in the Richental *Chronik des Konstanzer Konzils*), almost certainly to refer to brass instruments equipped with slides, but it seems highly improbable that these were already U-slides.[21] The iconography is ambiguous at best. The first unquestionable depiction of a trombone with all its elements in place is still the Filippino Lippi *Assumption*

18 See Carter, *Trombone* (see n. 4), 1, for a list of scholarly contributions to the discussion.

19 Carter, *Trombone* (see n. 4), 10–14.

20 Carter, *Trombone* (see n. 4), 64–69.

21 Carter, *Trombone* (see n. 4), 76–77.

in Rome from ca. 1489;[22] the examples from before this date that show some characteristics of the trombone amount to just a handful, and none of them is quite convincing as a representation of a workable model. As I've suggested elsewhere, they seem to be the products of artists who were grappling with depicting a new and unfamiliar object.[23]

There is, however, an intriguing iconographic example from the 1440s that might lend some support to the notion that the trombone had been invented by that date. This is from the manuscript[24] written by Zorzi Trombetta, trumpeter on a Venetian galley plying the trade routes from Flanders to the Levant from 1444 to 1449. Zorzi also served as a wine merchant, and on a page detailing some of his wine selling transactions we find a number of ideographs, many of them so far inexplicable.[25] But two of them are fairly clear representations of brass instruments; see Figure 3a–b.

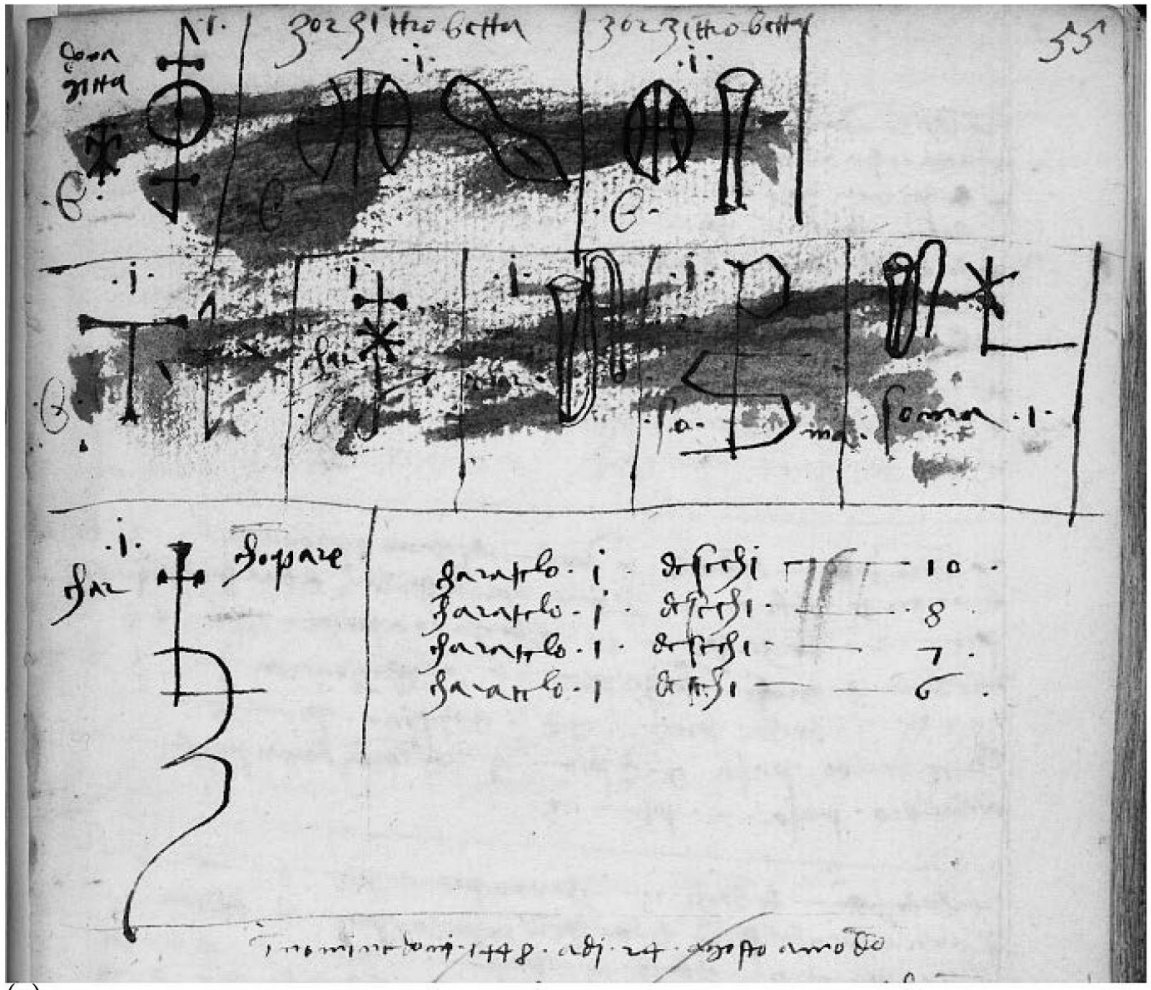
Of possible significance is the fact that the format of the instruments depicted is that of the trombone, not the trumpet; that is to say, the two bows extend beyond the bell and the mouthpiece, whereas in the trumpet of the time the bell and mouthpiece extend beyond the bows. We should bear in mind here that these sketches, crude though they may be, were produced by a player, not an artist, and thus by someone intimately acquainted with his own instrument. On the other hand, none of the contratenors included in Zorzi's manuscript is a *contratenor bassus*; all occupy the same range as their

22 For a colour reproduction of the Lippi *Assumption* see Carter, *Trombone* (see n. 4), Figs. 8a and 8b, 47.

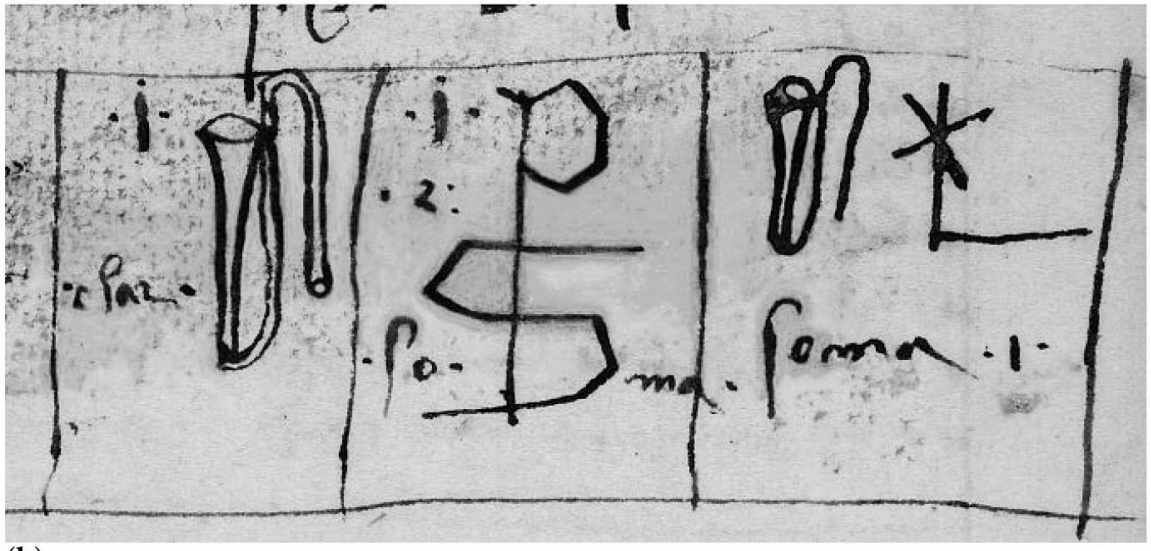
23 Myers, "Evidence of the emerging trombone" (see n. 10), 7–8 and 29.

24 London, British Library, Ms. Cotton Titus A.XXVI (1444–1449), fol. 55r. For a discussion of the musically relevant portions of the manuscript, see Daniel Leech-Wilkinson, "Il libro di appunti di un suonatore di tromba del quindicesimo secolo", in: *Rivista italiana di musicologia* 16 (1981), 16–39.

25 It seems probable that these ideographs relate in some way to the persons involved in the wine sales listed in the lower part of fol. 55r; for a transliteration of this list, see Leech-Wilkinson, "Il libro" (see n. 24), 37–38. Perhaps symbolic representation was necessitated by the illiteracy of some of the participants. But a few of the designs appear to be based upon letters, such as an overlapping S and P (possibly intended as the initials of Stefano de Polo, whose name is found twice in the list).




(a)




(b)

Figure 3: (a) London, British Library, Ms. Cotton Titus A.XXVI (1444–1449), fol. 55r (top two thirds of page); (b) Detail of fol. 55, edited image (stains digitally removed). © British Library Board.

associated tenors.[26] Thus, if these sketches are to be taken as evidence of the invention of the U-slide, they suggest the purpose of this improvement was evidently not at first to extend the range downwards but rather to produce a more manageable, less awkward tool.

## Mixed or not?

It is interesting to speculate as to why the shawm band continued throughout its existence to include brass instruments. Shawms were certainly capable of playing in an "unmixed consort", and – if we are to believe the iconography – they often did so in the 15th century. But at the same time, the trio combination of treble shawm, bombard, and some form of brass instrument seems to have been fairly standard. It is not difficult to explain this phenomenon in terms of "structural instrumentation", according to which the different functions of contrapuntal voices might be made clear. The association of the brass instrument with the contratenor function seems well established, and its contrasting timbre serves as an aural marker to differentiate it from the tenor part occupying the same range. But the combining of brass with the loud reeds not only survived the transition to a more egalitarian style of imitative counterpoint, as became typical in the 16th century, but it continued to survive into the period when we know the shawm family had been expanded to more than cover all vocal ranges. There are three possible contributing factors to the survival of this practice. One might have been simply tradition: "this is just what we do". Another likely factor has to do with convenience: a trombone is much easier to carry around than even a *BassetPommer*, let alone a *BaßPommer* – an important consideration for musicians performing outdoors. But I think a further consideration concerns timbre: in my experience the brass sound seems to ameliorate some of the pungency of the bright reeds and to bring some cohesion to the whole without muddying the texture.

26 See Leech-Wilkinson, "Il libro" (see n. 24), 39.

In a number of 16th- and 17th-century illustrations of shawm bands, we see that another "brass" instrument has been added: the cornett.[27] The earliest illustration I have encountered of a cornett included in a shawm band is in one of Vittore Carpaccio's huge paintings in the Venice Gallerie dell'Accademia illustrating the St. Ursula legend and dating from 1497/1498; it is a tiny detail from the background, and thus – probably intentionally – none too clear.[28] Somewhere in the latter part of the 15th century the cornett itself seems to have attained status as a fully respectable musical instrument. In 1454, at the Banquet of the Vow (or the Feast of the Pheasant, as it is also known), Philip the Good's lavish event staged to drum up support for a new Crusade, one of the interludes was a solo performance by a player of the "German cornett" which was said to sound "very strange".[29] By the 1480s the use of the instrument in a solo capacity had bloomed, particularly in southern Germany, and by the end of the century the cornett had joined the trombones as their soprano voice to form a *de facto* family; that family had also begun to be used in the role it was destined to play for the next two centuries or so: accompanying choirs.[30]

27 See for instance the often reproduced image of a six-piece loud band in the *Procession in honour of Our Dear Lady of Sablon* by Denys van Alsloot, 1616 (Madrid, Museo del Prado), shown in this detail: http://kimballtrombone.com/wp-content/uploads/2010/04/alsloot-1616.jpg (6 February 2019). Other examples (among many) include the *Accord de haulbois* by Jacques Cellier, ca. 1585 (Paris, Bibliothèque nationale, Ms. fr. 9152, fol. 169), reproduced in: *Galpin Society Journal* 10 (1957), Plate VII, and *The Munich Stadtpfeifer at the Great Shooting Match* (anon., 1577, Munich Stadtarchiv), reproduced in Carter, *Trombone* (see n. 4), Fig. 84, 294.

28 The painting in question is *The meeting of St. Ursula and the prince.* The shawm band is to be found in the left-hand side of the painting (which depicts the departure of the prince from his father); the group is standing on the quay across the water from the foreground group (and just above and to the left of the head of the father). The cornettist is depicted at the far left (from our point of view) of the six-member ensemble. A reproduction of the painting can be found at https://commons.wikimedia.org/wiki/File%3AVittore_Carpaccio_045.jpg (6 February 2019).

29 Marix, *Histoire* (see n. 11), 39.

30 See Polk, *German instrumental music* (see n. 11), 72.

## Other wind instrument families: recorders, douçaines

Besides the shawms, there are only two other 15th-century families of wind instruments to be considered: recorders and *douçaines* – the *douçaine* remaining the great "mystery instrument" of the era. (Tinctoris's brief description[31] is still the only one we have, and there is no known labelled picture.[32]) Without direct evidence of sizes and pitches, we are again left to base our guesses on parallel and subsequent developments. Since recorded purchases of sets of both recorders and *douçaines* were by or for loud bands, it would stand to reason that the makeup of the sets would have followed the model of the shawms: a set of four (the usual number) would probably have consisted of two higher ones, conceptually in G, and two lower, in C. A set of recorders of these sizes (basically Virdung's *Discant* and *Tenor* sizes) would cope with the great majority of the composed polyphony of the first half of the 15th century – even more likely to have been the repertory for recorders than it was for shawms.[33] Again, however, as with the issues of the *contre* shawm and the development of the trombone, the "big question" concerns when the bass recorder[34] was invented. The first evidence of the bass recorder is from Virdung, while the demand for it – if we consider the probable repertory – would seem to precede the date of his treatise by at least a few decades. Between 1460 (the approximate date of *EscB* – see n. 15) and the 1490s, the number of compositions with low contratenor parts increased dramatically. For instance, the manuscript Rome, Biblioteca Casanatense 2856, copied probably ca. 1492, contains 123 pieces, 101 of which have low contratenors; Florence, Biblioteca Nazionale Centrale, MS Banco Rari 229, copied about the same time, contains 268 pieces, 247 of which have low contratenors. Already by 1475, the approximate date of Yale University, Beinicke Library MS 91 (the *Mellon Chansonnier*), the change was well underway;

31 *De inventione*, Baines translation (see n. 13), 20.

32 See Anthony Baines, *Woodwind instruments and their history*, revised ed., New York: W. W. Norton & Co. 1963, 234–235.

33 See Keith Polk, "The recorder in fifteenth-century consorts" in: Lasocki (ed.), *Musicque de joye* (see n. 1), 17–29: 19–23 and 25.

34 That is, a recorder in F, called a *Bassus* by Virdung but later a *Basset* by Praetorius, for whom the *Baß* had become an instrument built a fifth lower, in B♭.

here significantly over half (34 of 57) of the compositions have low contra-tenors. Clearly, instrumentalists playing such composed polyphony would have exerted pressure on builders to develop sizes capable of playing in the bass register. It seems quite likely – though in no way provable – that the recorder quartet that performed a *chanson* during the 1468 festivities for the marriage of Charles the Bold[35] included a bass recorder; the fact that the composition they played was in four parts is in itself suggestive, in that a four-part texture would have been forward-looking for the time. Therefore, I should be surprised if the bass recorder had not been invented by the year 1470 or so, but we shall probably never know for certain.

## And the viols?

I have dwelt here on the thorny issues of the *contre* shawm, the trombone, and the bass recorder especially because of their relevance to the invention of the viol. While there are many factors – musical, acoustical, ergonomic, social, political – to consider in tracing this invention, surely one of the most important has to be simply the need for a bowed string that could reach down to the bass register;[36] the idea to expand it into a family with all members being played *a gamba* might well have come along just a little later. Before the viol appeared, the only string instruments capable of entering the bass range were plucked strings: lute and harp. With this general need for a bass bowed string in mind, we may have to reconsider some of Ian Woodfield's conclusions regarding the viol's early history. In his groundbreaking study, published in 1984, Woodfield postulated a Spanish – and specifically Valencian – origin.[37] According to his theory, Valencian makers combined

35 See n. 6.

36 This consideration, along with the idea that viols adopted the tuning pattern of the lute (largely in fourths) in order to ease finger stretches, was stated by Curt Sachs, *The history of musical instruments*, New York: W. W. Norton & Co. 1940, 347–48.

37 Ian Woodfield, *The early history of the viol*, Cambridge: Cambridge University Press 1984. Woodfield (ibid., 4) rejected Sachs's hypotheses (see n. 36), calling his explanation for the viol's use of the lute tuning a "none-too-convincing idea". Sachs, I suspect, had

the physical characteristics of the *vihuela de mano* with the *a gamba* playing position of the Moorish *rabab* to produce a tenor-range instrument serving primarily to provide a drone accompaniment to the voice; it was only when the instrument migrated to Italy that it was made capable of carrying a melodic line. Woodfield based this theory in part upon the apparent similarity of the *vihuela de mano* and the *vihuela de arco*; he assumed that they were, at least for a period of several years, a single instrument type "to be bowed or plucked at will".[38] This idea seems to me in itself highly questionable, given the very different acoustical and mechanical requirements of plucked and bowed strings.[39] It is, moreover, based almost entirely upon iconography, and here, I think, Woodfield has been somewhat selective in his choice of which evidence to believe. He has more or less discounted the evidence for rounded pressure bridges (including the earliest example he cites[40]) in favour of that for guitar-type stringholders. (We should bear in mind here that it would have been easy for artists themselves to be confused by the similarity of the two types of *vihuela*, transposing features of one to

considered his own conclusions to be so obvious as to require little elaboration, particularly in a general history of instruments.

38 Woodfield, *Early history* (see n. 37), 52.

39 The mechanical differences imposed by the need of the bow to have access to the strings of a bowed instrument are quite obvious. Less apparent (but nevertheless important) are the differing acoustical needs of plucked and bowed strings. In the case of a plucked string, all the energy is imparted at the beginning of the sound, which means it is the task of the resonator to deal efficiently with this energy as it doles it out sparingly over time; in the case of a bowed string, the input of energy is instead constant, and the consideration then becomes how to damp some of the resonances of the instrument body and spread them out so that certain pitches are not favoured over others.

40 This is the *Madonna and child with angel musicians* by Valentin Montolíu in San Felíu, Játiva, Valencia (previously dated ca. 1473; more recently, ca. 1475–1485) – Woodfield, *Early history* (see n. 37), Plate 38, 62. Since the time of Woodfield's research an earlier iconographic example has been found, a viol-playing angel musician in a ceiling painting in the Cathedral of Valencia, executed by Francesco Pagano and Paulo da San Leocadio, 1472; for details in colour of both of these instruments (the Montolíu after extensive restoration) see www.orpheon.org/OldSite/Seiten/education/OldestViolada gamba.htm (6 February 2019). The Valencia Cathedral example clearly possesses a pressure bridge – possibly crenellated and only slightly rounded, if at all.

the other – much as we have seen with depictions of the slide trumpet and early trombone. And we find in some of the iconography a mixture of elements that do not belong together, such as a tailpiece along with a stringholder – definite signs of such confusion.[41]) While the viol may still turn out to have originated in Valencia, it may at the same time have had the ability to play melodically from its inception; this would mean it did not depend on importation to Italy for development of that ability, and thus its dispersal to other countries besides Italy could have been more immediate and direct. Might such a direct route from Spain to German-speaking lands help explain the somewhat mysterious use of the term *Rybeben* for viols in German sources, such as the *Triumphzug* of Maximilian I?[42]

Woodfield's theory of the Valencian viol as primarily a drone instrument fitted well with the prevailing attitude of the 1980s, when it was being questioned whether even skilled instrumentalists had the ability to play part-music before quite late in the 15th century. As David Fallows put it in 1982, concerning even the highest-paid minstrels of the age, "they played improvised or semi-improvised music that was essentially monophonic – melodic music with an accompaniment that would rarely have been more than a drone or something equally independent of written traditions".[43] In the meantime a pushback has begun to take place, and we are discovering more and more evidence of the polyphonic sophistication of 15th-century instrumentalists.[44] For instance, we find references to minstrels who played specific

41 For instance, see Woodfield, *Early history* (see n. 37), Plate 33, 55, a painting of the Sardinian school, ca. 1500, depicting an angel musician playing a viol with both stringholder and tailpiece. Woodfield has chosen to treat this Sardinian example as somehow representative of the Valencian type of viol (ibid., 69).

42 See Herbert Myers, "The musical miniatures of the *Triumphzug* of Maximilian I", in: *Galpin Society Journal* 60 (2007), 3–28: 11 and 17.

43 David Fallows, *Dufay*, London: J. M. Dent 1982, 2.

44 See for instance Keith Polk, "*Vedel* and *Geige* – fiddle and viol: German string traditions in the fifteenth century", in: *Journal of the American Musicological Society* 42/3 (1989), 504–546. Polk cites numerous archival references from throughout the 15th century to groups of German string players who were clearly performing polyphony, and he points to evidence of continuing traditions of performance that suggest that the viol did

parts in polyphonic textures, such as to Nicolo d'Allemagna, hired to play contratenor shawm in 1406;[45] clearly one would not have to specialize in this way in order to play a mere drone! Then we have the record from 1415 of *prusuner* sounding their instruments "one above the other in three parts, as one customarily sings" and another from 1417 of *prosonen* accompanying vocal polyphony.[46] And we have the proven – if not quite yet perfect – musical literacy of Zorzi Trombetta in the 1440s; Zorzi – alias Georgius Nicolai de Mothons – went on to become one of the founding members of the *piffari* and *tromboni* of the doge of Venice in 1458, and he continued to serve in that group until sometime in the 1490s (at which time it is certain that its repertory included Franco-Flemish polyphony).[47] There are hints of the participation of instrumentalists in the performance of composed polyphony at the Banquet of the Vow (1454)[48] and more concrete evidence of such participation during the marriage festivities for Charles the Bold (1468).[49] Finally, there are the numerous manuscripts containing polyphonic compositions without text, the compilation of which began in the last quarter of the 15th century; these manuscripts attest to the need of instrumentalists for sources of repertory.[50] Certainly the time has come for a reassessment of the

not appear abruptly in Germany ca. 1500 but had had an indigenous presence there for a few decades before that (although, as he admits, there is no iconographic evidence to support this idea).

45 See n. 11.

46 Ulrich von Richental, *Chronik des Konstanzer Konzils* (1414–1418); cited in Carter, *Trombone* (see n. 4), 76–77.

47 Rodolfo Baroncini, "Zorzi Trombetta and the band of *piffari* and trombones of the *Serenissima:* new documentary evidence", in: *Historic Brass Society Journal* 14 (2002), 59–82, and idem, "Zorzi Trombetta da Modon and the founding of the band of *piffari* and *tromboni* of the *Serenissima*", in: ibid. 16 (2004), 1–17.

48 Various instrumental combinations described in the reports of the occasion (by Olivier de la Marche and Mathieu d'Escouchy) suggest polyphony was involved, but the genres of composition are generally not specified; see Marix, *Histoire* (see n. 11), 37–41.

49 As noted above, those festivities included a quartet of loud instruments that played a motet and a quartet of recorders that played a *chanson*; see n. 6.

50 See Jon Banks, *The instrumental consort repertory of the late fifteenth century*, Aldershot: Ashgate Publishing Limited 2006.

early history of the viol in light of these discoveries and newer ways of looking at the evidence.