CORNETTS AND HISTORICAL PITCH STANDARDS

Bruce Haynes

As an indicator of historical pitch, the cornett has much to recommend it. Its one-piece construction makes it difficult to shorten without throwing internal intonation out of balance. Its basic design remained stable over a long period, and during that period, the majority of cornetts came from one place. Anthony Baines writes,

> Among the [cornett] survivors in the big collections, those of Venetian manufacture predominate, which is appropriate, since Venice seems to have been the principal focus of design during the period. German courts, for instance, frequently bought their wooden wind instruments from Venice.... This, and the constant migration of players from one country to another, led to some degree of standardization in instrumental playing-pitch.[1]

Cornetts made in Venice were frequently exported to other parts of Europe: a contract with the Bassanos in 1559 speaks of customers "qui dela cita come de fora."[2] Vincenzo Galilei said that the best cornetts of his day were made in Venice.[3] Nuremberg, which in the 16th century had virtually no competition in selling its brass instruments, was not able to compete as successfully on the woodwind front. Ekkehart Nickel writes,

> The Munich court, for instance, between 1550 and 1600 obtained most of its trumpets from Nuremberg, while the only woodwinds registered in the royal bursary records... came from Venice; likewise the court at Graz in about 1600 bought trumpets and trombones from Nuremberg, but cornetts and flutes from Venice. The Innsbruck court also purchased most of its trumpets and trombones from... Nuremberg, but ordered cornetts in 1585, a "Doltan" in 1588,...and a "large Concert Flaut" in 1591 from Venice.[4]

The fact that most cornetts came from a single city (and one with strong guilds)[5] indicates a uniformity of design, and suggests that surviving instruments offer pitch information that is generally valid for the places cornetts were played.[6] That the basic design of the curved cornett changed little in the course of the 16th and 17th centuries is also an indication of the stability of its pitch level.

The reliability **of pitch information from cometts**

Two historical indications of the relative inflexibility of cornett pitch are Michael Praetorius' allusion to moving the mouthpiece in and out and Bartolomeo Bismantova's description of tuning joints for the cornett. Praetorius wrote,

Auch einem Cornet, dergestaldt / dalI man oben das Mundstuck weiter herausser oder tieffer hinnein stecke / zuhelffen ist.[7]

Even a cornett can be helped into tune by moving the mouthpiece in or out.[8]

Bismantova wrote in more detail in 1677:

...Procurando ancora di sentire prima il tuono chorista del Organo; 6 altro [G2 clef][9] et in caso, che fosse pit' alto il Cornetto de Organo; bisognera mettervi una 6 pitt Giunte; et se fosse per il contrario pin basso di voce; all'hora bisognera levarne.

Occorendo aggiungere al Cornetto, Giunte di sopra, fuori del solito; per essere l'Organo assai basso; sari prima necessario, mettere per di sotto, dentro alla bocha del fondo, di detto Cornetto; una Guinta a proportione, alto un Dito traverso, 6 occorendo, e che detta Giunta sia di legno; e che sia forata; con it bucco largo, come la boccha del Cornetto; e che vi sia la sua imbocatura, che vadi ben serrata per di dentro alla boccha del Cornetto; e che sia detta Giunta fatta, e forata al Torlo; e si questo; accie• slongando it Cornetto di sopra, e di sotto, le voci tune; e in spetie l'acute, venghino giuste; come l'istesso, si fa del Flauto; e l'aviso serva, con iuditio; overo se nel fondo di detto Cornetto vi sara per adornamento, la Legatura d'Argento, alta, e movibile; si portra questa slongarla; che fara effeto, che fa la Giunta.[10]

... [One should] also endeavor first to listen to the *tuono chorista* of the organ or other *[strumento acuto].* In the event that the cornett should be higher than the organ, it will be necessary to attach one or more [tuning] joints, and if, on the contrary, it should be lower in pitch, it will be necessary to remove them.

If it should be necessary to attach more tuning joints than usual to the top of the cornett because the organ is quite low, it will first be necessary to place into the bottom end of this cornett a joint of approximately one finger's width or possibly more. This joint must be made of wood, it must be bored with a hole as large as the opening of the cornett, its mouth must fit tightly into the opening of the cornett, and it must be made and turned on a lathe. This lengthening of the cornett above and below is done so that all the notes, especially the high ones, will be in tune, j ust like that [lengthening] which you do on the recorder, but use good judgment in applying this advice. If, on the other hand, there should be a long and movable silver ligature as an ornament at the bottom end of the cornett, you can lengthen this, which [lengthening] will have the same effect as that of a tuning joint."

If we take this extreme lengthening, that of " a joint of approximately one finger's width or possibly more," to be 2 cm, plus 1 cm at the top of the cornett, the total difference in pitch (based on the general relation between length and pitch discussed below) can be estimated at about 66 cents. Since both here and in what follows, Bismantova counts on being able to tune not only lower but higher, it would seem his instrument was normally tuned at about the midpoint between the extremes. The differences he discusses would therefore be on the order of 33 cents in either direction. If the average pitch of a cornett was A-471, it could be lowered by these operations to A-462 or raised to A-481.[12] The fineness of this tuning, with a range of a third of a semitone in either direction, indicates how specific Bismantova (who was a cornett player himself) considered the instrument's pitch to be.

This would seem to be a case of an adjustment within a single pitch standard; we cross

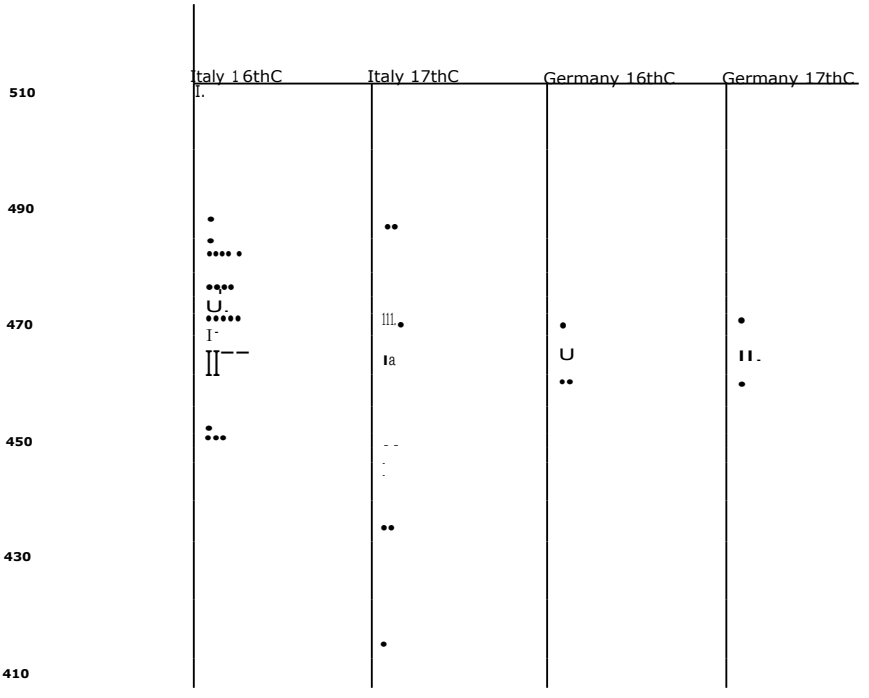
Se per sorte si trovasse Organi, o Cembali, che fossero assai bassi del Corista; e che it Cornetto non si potesse accordare, ne accomodarsi con le voci a quel Tuono; in ocasione di suonare, Sinfonie, 6 altro; in questo caso bisognera accordare it Cornetto unavoce pitt alta; e puo suonare, unavoce piu bassa; e bisognasaper suonare per tutte le Chiavi; per poter suonare Spostato ne bisogni.[13]

If by chance organs or harpsichords are found that are lower than the *Corista,* and if the cornett can neither be tuned nor accommodated in pitch to the mode in which *Sinfonie* or other [pieces] are being played, it will be necessary to tune the cornett one step higher and then to play one step lower. It is therefore necessary to know how to play in all the clefs in order to be able to transpose, if necessary.[14]

the line into a different standard in Bismantova's next passage:

On the face of it, Bismantova's statement is illogical; to "accordare it Cornetto una voce piit alta; e puo suonare, una voce piu bassa" would be to arrive where one started. But Bismantova probably means "tune the cornett one step higher than the *Corista* and then play one step lower than the *Corista,"* in other words, tune up a semitone and transpose down a whole tone.[15] This must have been an approximate solution, since (as we have just seen) the player probably had a range of less than a semitone to "accordare it Cornetto."

Despite these early estimates of the precision of cornett intonation, the common wisdom nowadays is that differences in pitch between cornett players are extreme, and therefore pitch data from the instrument is unreliable. I have found, however, that most professional players (those whom Rainer Weber graciously calls "wirkliche Zinkenisten"[16]) do not share this attitude. As we will discuss below, the available data shown in Graph 1 seems to show consistent patterns, suggesting that it is fairly accurate. We will also consider how sounding length can be roughly correlated to pitch, offering a cross-check on accuracy.



Graph 1
Italian and German Cornett Pitches

One experienced player, Douglas Kirk, demonstrated various sizes and shapes of mouthpiece for me. Their "popping frequencies"[17] varied by a fifth. On the instrument, however, and under real performing conditions, all of them played at exactly the same pitch. Kirk, like other professional players I have consulted,[18] makes a clear distinction between information provided by occasional players and that of experts who perform regularly in concerts. These players seem generally to agree that the instrument's pitch is consistent and that they would (and do) all report approximately the same levels.[19]

The pitches of original instruments

Surviving Italian and German curved cornetts of the 16th and 17th centuries in reasonable playing condition are listed in Appendices 1 and 2 and are also shown in Graph 1.[2o] Several patterns emerge from this graph.

The German pitches are clearly consistent; they average exactly A-465 in both the 16th and 17th centuries. Italian 17th-century cornetts are in three clusters: the lowest ranges from A-435 to A-450 and averages A-442. The middle ranges from A-460 to A-472 and averages A-466. The highest (represented by only three examples) is just below A-490.[21] Pitches in the 16th century in Italy are more diffuse but there appear to be two clusters, the first ranging from A-435 to A-452, the second from A-457 to A-484. The pitches above A-484 are spread and (compared to the lower clusters) do not appear to indicate a particular level 2[2] Of the two clusters, the lower averages A-444 and the higher A-471.

If we are able to trust the reports of players, then, we can conclude the following:

1) There was a lower cornett pitch (in Italy only?), in both centuries, atA-443, or -C.[23]
2) A second pitch shows a central core at A-470, which is -Ct. This pitch was by far the most usual, and was common to both centuries and both countries.
3) A few instruments (again only in Italy) show scattered levels above A-484 but are not frequent enough to indicate a specific standard.

On the basis of surviving instruments, then, there is a reasonably unambiguous level that we can assume was considered "cornett pitch:" although it was less specific in the 16th century, its center was never far from -CI (A-470).

In theory, the accuracy of the pitch information shown in Graph 1 could be checked by comparing sounding length to pitch. By drawing a "regression" line through x and y coordinates, their correlation could be tested. But in practice, there are several obstacles to this approach. The biggest is the uncertainty as to how lengths have been obtained: the inside curve is obviously shorter than the outside, and an average is different again. Also, length is not the only factor that determines a cornett's pitch. Other factors include "fingerhole size and placement, bore profile and polish, and airtightness, not to mention the effect of the performer."[24]

The establishment of a correlation between length and pitch will probably be possible when more physical data is available, and could not only serve as a check on pitch reports but also help in estimates of pitch when length alone is known. Based on the present data,

pitch apparently changes about 6 Hz for every centimeter of length. Using the averages of the pitches reported in Appendix 1 together with calculations of the lengths of cornetts depicted in Praetorius's *Sciagraphia,* it is possible to estimate that one of his cornetts at 58.3 cm would play at about A-460 and the other at 57.6 cm at about A-464.[25] Mersenne's treble cornett at one and three-quarterspieds *du Roy* (or 56.8 cm),[26] would (on this basis) yield A-469.

Transposition

In the early 17th century instruments were classified into three categories: high, natural, and low *(strumenti acuti, coristi,* and *gravi).*[27] Like the violin, the curved cornett was in the highest of the three. While the highest normal clef for singers was Cl ("soprano clef"), cornett parts were usually notated in "violin" or G2 clef.[28] G2 was a *chiavetta,* or high def. For singers, the use of *chiavette* normally implied downward transposition. But by the beginning of the 17th century the upper instrumental part in violin clef is sometimes marked *come sta* or *ally aka* to prevent transposition downward.[29] Banchieri (1601) wrote that the violin clef was more common for instruments than voices because

the suonando cosi all'alta fanno phi viva l'harmonia."	when they are played thus at high pitch they make a more lively sound.

This passage reminds us of Praetorius's comment,

Dann je holier ein Instrumentum in suo modo &genere, als Zincken / Schalmeyen und Discant Geigen intonirt seyn / je frischer sie lauten und resoniren....	For the higher-pitched an instrument (within its class and type) is made, as with cornetts, shawms, and descant fiddles, the fresher they sound....[31]

By Banchieri's time, downward transposition was apparently not expected of instruments playing alone or performing obbligato parts, even when their parts were notated in *chiavette.*[32] This principle is found in other sources as well.[33] Compare instructions such as Croce's (1594): "Alla quinta bassa, e in tuono per sonare" ("At the fifth lower [when performed by voices], and at pitch when played by instruments"); and Banchieri's, for different pieces in his *Sinfonie a 4* (1601):

trasportato alla quinta per le voci... In tuono per voci & stromenti... In tuono per cantare, & una quarta superiore per gli stromenti.	transposed a fifth for voices... At pitch for voices and instruments...At pitch for voices, and a fourth up for instruments.

But as Bismantova pointed out in the passage cited above,

Bisogna saper suonare per tutte le Chiavi; per poter suonare Spostato ne bisogni.

It is...necessary to know how to play in all the clefs in order to be able to transpose, if necessary.

He wrote this about situations in which the organ was not at the usual cornett pitch. But what did he mean by *chiavi?* The term was understood at the time to mean def plus key signature, so in fact (as can be seen in Aurelio Virgiliano, "Modi tutti da sonar it cornetto," ca. 1600) Bismantova is suk:esting that his readers learn to play in all the possible modes/keys (which was approximately like learning the scales of all the standard tonalities) 34

Half-step transpositions were impractical because of meantone tuning and the fingering of the instrument. Simple scales such as C would turn into B and Ct. Whole-step and minor third transpositions were much easier and more practical. It would therefore have been useful to have on hand curved cornetts at pitches a semitone apart; this could explain why the most common cornett pitches were at -Ct and -C. It is conceivable that players owned two or even three instruments pitched in consecutive semitones, allowing whole-step transpositions in various combinations to produce any required scale.[35] Graham Nicholson points out that cornett number EA1 51 X 1952 at The Hague is probably by the same maker as the two well-known Oxford Christ Church instruments;[37] the former is at -CI, the latter two at -C. A sign of the prevalence of these two pitch levels is Charles Foster's reconstruction of Praetorius' *bassanelli.* Using Praetorius' measurements, he found the pitch to be 472 to 446, or a little above -0 to -C. The *bassanelli,* Foster believes, is designed to be played at any pitch between these extremes: "It plays at a variety of pitches, variable within the range of a semitone, with good intonation on every note, including those produced with the aid of cross-fingerings."[38]

While it seems cornetts were predominantly at instruments a semitone lower would have been useful in Rome (where most organs were tuned to -136[39]) and in the north where some organs starting around 1600 were at -D (like the Antegnati at S. Maurizio in Milan), since in both cases the transposition would have been a simple whole-step. We know that cornetts were sold in pitches a semitone apart, as can be seen in a contract made in 1559 between three Venetian wind players in the service of the Doge of Venice and two instrument makers of the Bassano family:

...corned aid si de mezo ponto come etiam de tuto ponto L4 luno de picoli corneti muti de tuti i toni L2s8 luno....

... loud [curved[cornetts, both at *mezo ponto* and *tuto ponto,* four *lire di piccoli* each, mute cornetts at all pitches, 2 *lire* and 8 *sokli* each....[40]

Mezo punt° and *tutto punto are* therefore probably the names of the pitch standards at -Ct and -C respectively. These terms were also used by the organist and builder G.B. Morsolino (Morsselino) in documents relating to the pitch of the organ of the cathedral at Cremona:41

Tutti gli organi che ho visto a vita mia et in Italia et fuori[42] et massime ove si fanno concerti con huomini rarissimi tutti dico gli ho trovati nel tuon del cornetto di mezo punto, the e pits alto un tuon del nostro di che Nora trattamo; it quale a nel tuon del cornetto di tutto punto; che[43] un tuon pits basso dell'altro di mezo punto. Onde avviene che non volendosi scomodar gli organi peril riguardo de gli stromenti da fiato, si lassano nel detto tuon di mezo punto...[44]

All the organs I have seen in my lifetime, either in Italy or elsewhere, that are normally used to perform with the greatest performers, are in the cornett pitch of *mezo punto,* a [semi] tone[45] higher than ours that we are presently discussing at the cornett pitch called *tutto punto,* which is a [semi] tone lower than the other that is called *mezo punto.* This situation obtains because, not wishing to hinder the organs when playing with the wind instruments, they leave them in the abovementioned *mezo punto* pitch...

Mute cornetts

Mute cornetts remain to be discussed. Appendix 2 lists surviving mute cornetts in reasonable playing condition. Few modern cornettists regularly play the instrument, so the reports of players are less reliable. The mute cornett often seems to have had a different musical role from the curved one. This may be reflected in the difference in pitch between curved and mute cornetts. Praetorius notes in two different plates (viii and xiii) that the mute cornett is in G, i.e., a whole tone below the "normal" curved cornett in A. Myers calculated that Praetorius' mute cornett in Plate viii no.9, with a length of about 66 cm, suggests a pitch of about A-409 if it is considered to be in A.[46] An instrument inventory for the city of Nurnberg drawn up in 1 575 lists:

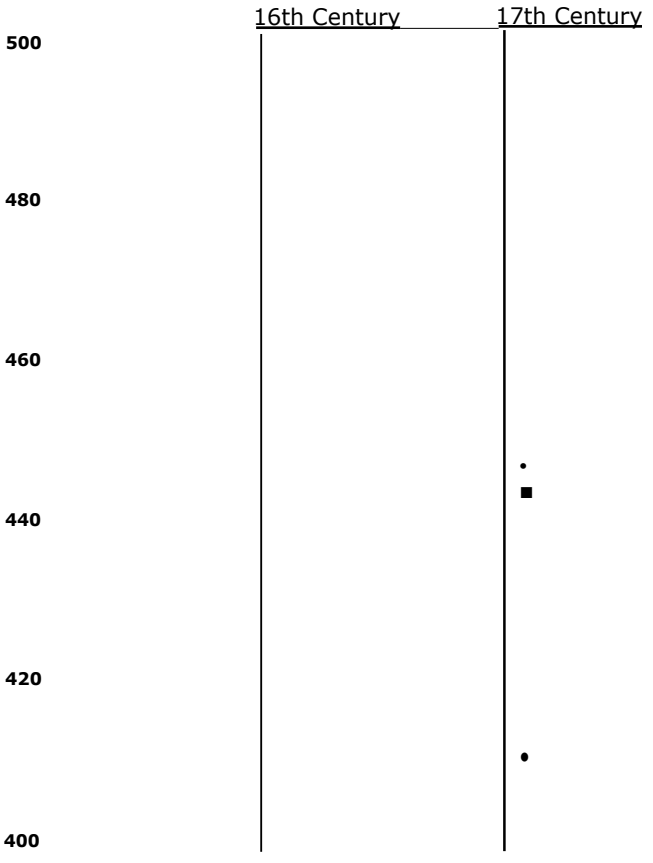
Item ein Cornet umb ein Secund grober *[sic]* als die andem.[47]

Item one cornett pitched a second [larger?] than the other.

–which could refer to a mute cornett.

Graph 2 shows mute cornett pitches assuming (for the sake of comparison) the instruments are in A. The average, as can be seen, is considerably lower than that of cornetts with separate mouthpieces.

As Anne Smith suggests, instruments of this period appear to have characteristic pitches.[48] According to Praetorius, shawms were a tone higher than cornetts and sackbuts; cornamuses were at *Chorthon,* a tone below *Cornettenthon.*[49] The distinction between instruments in different pitch categories *(strumenti acuti* or high instruments—probably at



Graph 2
Mute Cornett Pitches

mezo punto—and strumenti coristi or instruments at *corista)* may explain why certain instruments like Renaissance flutes (whose surviving pitches are mostly at A-405)[50] and mute cornetts were normally pitched lower than curved cornetts, violins, and other "treble" instruments. Weber wrote that "Transverse flutes and mute cornetts are... those wind instruments which appear together with strings in the so-called *'Still/* or 'Broken' Consort."51

Smith noticed that these instruments are often called for together in both religious and secular settings. Among other examples, she indicated works by Schutz and Schein.[52] Praetorius noted that,

Die Bitten and andere *Instrumenta* in solchem niedern Thon lieblicher/als im rechten Ton lauten/und fast gar eine andere art im gehor...mit sick bringen.[53]

Flutes and other instruments are also more beautiful when tuned lower than our normal pitch, and at the lower pitch give quite another effect to the listener.

Most other instruments such as recorders and krummhorns were used primarily for chamber music, and were usually, like the more "normal" curved cornett, at the higher *Cornettenthon/ CammerThon.*[54] It seems likely, then, that the mute cornett (unlike the curved cornett) was usually classified among the *strumenti coristi.*[55]

The significance of identifying "cornet pitch"

Cycles per second (or "Hz") were not commonly used and understood until the 19th century. Prior to that time, musicians quite logically identified their pitch levels in relation to other reliable and commonly available sources. In France, for instance, the most stable reference was the pitch of the opera orchestra at Paris; *Ton d'Opera* was therefore the common reference pitch. In England and Holland, the recorder was often used as a bearing (cf. "Consort Flute Pitch" and *Fluit of Kamer-Toon).* In Italy and Germany, since it was widely used, the most practical (and apparently reliable) reference was the cornett.

The contract for the organ of the Collegiata di S. Prospero in Re:io Emilia built by Baldassarre Malamini in 1609 describes the instrument as "di died piedi, un tuono pill basso del cometto."[56] In 1577 the Cathedral organ at Feltre was repaired by the Federici firm so

the ditto organo sii pos to nel suo ordinario tuono cioe nella voce del corneto di mezo ponto.[57]

that the said organ be put in its regular pitch, that is, in the cornett pitch of *mezo ponto.*

As noted above, Morsolino had related organ pitches to the "tuon del cornetto" *ofmezo punto* and *tutto punto.* Antonio Barcotto wrote in 1652:

[Li Organi] di Venezia sono delli pit' ald, che s'usino in questo stato, e s'adimandano in tuono dei Cornetti. Quelli portatili pur di Venezia, Padoa, Vicenza, ed altre Citta, sono un tuono[58] piii bassi, in voce umana, e si chiamano corristi.[59] Si usano queste diversity di tuono per commodity delle voci, e per gl'istrumenti, poiche li Organi, che sono aid, servono assai alle voci gravi, e alli violini, che riescono pit' spiritosi.[60]

[The organs] of Venice are among the highest used in that state, and must be tuned to the pitch of cometts. Chamber organs, though, at Venice, Padua, Vicenza, and other cities, are a tone lower, [corresponding to] the human voice, which is called *corristi.* This difference of pitch is used to accommodate voices and instruments, since organs that are high work well with lower voices and violins, which are for this reason more spirited.

T.B. Janowka, writing in Prague at the beginning of the 18th century, also described pitches in relation to the cornett:

Concordantix sunt organa in Germania & Boemia ubique usitata, qvx concordantia vulgo Zinck= seu cornett tonus vocatur; posterioris seu demissioris & qvidem uno integre, tong in Italia & Gallia audiun tur; qua' concordado choritonus seu Chor=thon vocatur, & cum hac posteriori concordant Gallic Fletnz seu Fletuse, Clarini humiliati, qvx omnia Instrumenta in sua clavi c cum Organo nostro in clavi b unisonant....[61]

Organs everywhere in Germany and Bohemia are tuned to the pitch commonly called *Zincle=* or cornett pitch; the other, a whole tone lower, is used in Italy and France and is called choral pitch or *Chor.thon,* and is the pitch of French flutes or recorders, mute cometts,[62] and all instruments that are in unison with the BI, of our organ when they play C....

Janowka followed here the old north-Italian system in placing *Chor.thon* (originally called *Tuono chorista* in Italy) a second below instrumental (i.e., cornett) pitch. Praetorius had noted with approval this usage and associated it with Prague; he sporadically and inconsistently used the term *ChorThon* in the same sense in his book.[63] It is also found in Alessandro Poglietti's instructions for tuning the harpsichord:

Cornetton ist umb ein Ton hocher, als Chorton.64

Cornetton is a tone higher than *ChorThon.*

The pitches of a number of early German organs that were originally identified as at *Cornet-ton* have been preserved:

A in HZ	Standard name	Location	Date
467	Cornet- oder Chor-Tono[65]	Freyberg, Dom	1714
464±	Cornett- oder Chor-Tono[66]	Freyberg, St. Jacobi	1717
464	Cometton[67]	Eisenberg	1733
458	Cornet-Ton[68]	Sulzbach	1746
460±	Cornet[69]	Gau-Odernheim	1771
466±	Cornett ton[7o]	Framersheim	1775
466±	Cornet Ton[71]	Gensingen	1779
460±	Cornetton[72]	Morstadt	1786
460	Cornetton[73]	Nieder-Florsheim	1784
450	Cornetton[74]	Kleinich	

The frequency averages A-462. It is similar to the most common cornett pitch shown in Graph 1.

A document written before 1681 about the organ at Corvey (Detmold) prescribes that

Die Orgell mug Cornetten Toen sein, so konnen alle musicalische Instrumenten einstimmen.[75]

The organ should be at *Cornet-ton,* so that its pitch will agree with every [other] musical instrument.

When Gottfried Silbermann's organ at the Jacobikirche in Freyberg was finished in 1717, one of the ways it was tested was described as follows:

Ob das Werck in richtigen Cornett- oder Chor-Tono stehe, einige von denen S tadt-Musicis mit Trompeten und Zincken blasen lagen, und mit dem Werke dazu accompagniret, und befunden, dag solches mit denen Instrumenten wohl eingestimmet....[76]

[To determine] if the organ stood at standard *Cornet-* or *Chorton,* some of the Stadtpfeiffer tried playing trumpets and cornetts accompanied by the organ, and found that it was quite in tune with them....

The instrument was at a-467.[77]

Johann Kuhnau, Bach's predecessor as Kantor at Leipzig, wrote that *Cornet-ton* had been the pitch there as well:

Ich babe aber fast von der ersten Zeit meiner Direction der Kirchen-Music [at the Thomaskirche in 1701] den Cornet-Ton abgeschaffet, und den Kammer-Ton...eingefiihret.[78]

Almost from the moment I took over the direction of church music, I eliminated the use of *Cornet-ton* and introduced *Cammerton*..

As late as 1772, Johann Andreas Silbermann wrote,

In gantz Teutschland ist vor diegem der Cornetthon iiblich gewesen, sonderlich haben sich die Orgelmacher degen gerne bedienet, weilen dadurch die grol3en Pfeiffen wenig platz einnahmen, und keine sonderliche Lange erforterten...aber dieser thon wegen seiner Mlle dem gesang beschwerlich war... .[79]

All over Germany, the most common pitch used to be *Cornet-ton.* It was especially popular among organ builders because the largest pipes took up less room, requiring no unusual lengths. But this pitch was troublesome to singers because it was so high....

That pitch standards used for tuning other instruments like organs had names such as *tuono del corneto di mezo ponto* and *Cornet-ton* testifies to the consistency of the pitch of cornetts. As Douglas Kirk has pointed out,[80] cornetts were not the fixers of pitch; they were simply made at certain standards. But although they did not initiate pitch standards, they carried them reasonably faithfully, so they were considered a handy and easily portable pitch reference. It is fortunate for us that cornetts were given this role, since once it is possible to determine what their usual pitch frequencies were, a number of other questions about early pitch standards can be approached with more assurance.

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NOTES

(NB: An asterisk indicates that the information was supplied in private correspondence or conversation)

1. Anthony Baines, *Woodwind Instruments and Their History* (London, 1957; ^{3}19 67), p. 241.

2. "Here in [Venice] as well as abroad." Giulio M. Ongaro, "16th-century Venetian Wind Instrument Makers and Their Clients," *Early Music* 13, no. 3 (1985): 393.

3. Vincenzo Galilei, *Dialogo della musica antica et della moderna (1581;* reprint, Milan, 1947), p. 146.

4. Ekkehart Nickel, *Der Holzblasinstrumentenbau in der Freien Reichsstadt Nurnberg* (Munich, 1971), p. 80. Translation by the present writer. "So bezog der Munchener Hof zwischen 1550 und 1600 die meisten seiner Trompeten aus Nurnberg, wahrend die in den Hofzahlamtsrechnungen einzig aufgefuhrten Holzblasinstrumente... aus Venedig stammten; ebenso kaufte der Grazer Hof um 1600 in Nurnberg Trompeten und Posaunen und in Venedig Zinken und Floten ein, und auch der

Innsbrucker Hof hatte nach 1581 einen Grogteil seiner Trompeten und posaunen von... Nurnberg bezogen, wahrend er 1585 Zinken, 1588 eine "Doltana"... und 1591 eine "groge Flaut per Concert" in Venedig besorgt hatte."

5. Alfredo Bernardini, "Woodwind Makers in Venice, 1790-1900," Journal ***of the American Musical Instrument Society*** 15 (1989): 53.

6. This uniformity was not complete. Praetorius (***Syntagma musicum,*** part 2, ***De Organographia*** [1618; reprint, Wolfenbuttel, 1958], p. 15) noted that "Wiewol der Englische Thon an Instrumenten nosh umb etwas / doch ein gar geringes / niedriger ist / welches an ihren Zincken / Schalmeyen oder Hoboyen (wie sies nennen) so daselbst gefertiget werden / zuvemehmen."

"The English pitch, however, is a very little lower, as the instruments made in that country show, for instance cornetts or shawms (`hoboys', as they call them in England)." Transl. David Z. Crookes, ***Michael Praetorius: Syntagam musicum II, De organographia, parts I*** and ***II*** (Oxford, 1986), p. 31.

7. Praetorius, ***Syntagma*** 2: 35.

8. Transl. in Crookes, ***Praetorius,*** p. 46. I am indebted to Herbert W. Myers (* 23 Mar 1993) for this reference.

9. Cf. the use of this clef for the ***strumenti acuti*** (discussed below under "Transpositions").

10. Bartolomeo Bismantova, ***Compendio musicale*** (ms., 1677), pp. [103-05].

11. Transl. based on that in Bruce Dickey, Petra Leonards, and Edward H. Tarr, "The Discussion of Wind Instruments in Bartolomeo Bismantova's Compendio Musicale (1677): Translation and Commentary," ***Basler Jahrbuch fir hirtorische Musikpraxis*** 2 (1978): 143-87.

12. This is almost exactly, by the way, the range of the middle cluster of cornett pitches in Italy in the 16th century (see Graph 1).

13. Bismantova, ***Compendia,*** p. [110].

14. Transl. based on Dickey, et al., "Discussion."

15. This interpretation was suggested by Bruce Dickey (* 27 Apr 1994), who added, "In any case I think it must be a whole-step transposition, because half-step transpositions (especially in 1677 with cornetts playing mainly in D major... and C major) would just be too impractical."

16. Arthur Mendel, "Pitch in Western Music since 1500: A Re-examination," ***Acta Musicologica*** 50, nos. 1-2 [1978]: 24.

17. The sound produced by tapping the playing end of the mouthpiece on the palm.

18. Michael Collver, Bruce Dickey, Stephen Escher, and Graham Nicholson.

19. Ralph Bryant (* Jan 1993) and Rainer Weber (cited in Arthur Mendel, "Pitch in Western Music," 24), however, suggest that most players use inappropriate mouthpieces that distort the pitch. This is disputed by other consultants, who believe that mouthpiece design (which can vary considerably) does not significantly influence pitch. Kirk's demonstration supports the latter opinion. Bruce Dickey (*27 Apr 1994) points out that using a "trumpet-style" mouthpiece that is too big for the instrument will produce an effect of "wobbliness."

20. Much of this information comes from Edward H. Tarr's important catalogue ("Ein 'Catalog erhaltener Zinken," ed. P. Reidemeister, ***Bas ler Jahrbuchfiir historische Musikpraxis*** 5 [1981]: 11-262). The pitch information in the catalogue is a compilation of reports by a number of different players. Douglas Kirk ("Cornetti and Renaissance Pitch Standards in Italy and Germany,"Journal***de Musique Ancienne 10,*** no. 4 [Summer 1989]: 16-22; here p. 22, n. 15) writes, "Although it is well-known that cornetti can respond differently in pitch to different players, I feel reasonably confident of the pitch data represented [in Tarr's article] . Tarr is a competent player, and tried the instruments together with other good players, among whom was Bruce Dickey. Furthermore, I have played a significant portion of the instruments myself, together with Don Smithers, and our results are very similar to those presented by Tarr."

Tarr divides the present condition of speci mens into four categories; the data here includes only the three best of these. Three instruments whose sounding lengths indicate serious aberrations are omitted (New York MM 89.4.1134, Paris E. 581, and Bologna M 1778).

21. These highest pitches may be similar to a level to which Praetorius ***(Syntagma*** 2: 15) alluded: "Now there have been some who have sought to raise this present pitch of ours a semitone higher still." ("Es seynd aber etliche gewesen I welche diesen jtzigen unsern Thon noch umb ein Sem itonium zu erhithen /sich unterstehen wollen.") Eng. trans!. by Mendel, "Pitch in the 16th and Early 17th Centuries,"Musical ***Quarterly*** 34 (1948): 28-45, 199-221, 336-57, 575-93. Reprinted in ***Studies*** in ***the History ofMusical Pitch*** (Buren, 1968).

22. In Italy there were organs as high as -D1 (see Bruce Haynes, ***Pitch Standards in the Baroque and Classical Periods*** [PhD diss., Univers ite de Montreal, forthcoming], section 2), so the existence of so me cornetts at -D is not surprising.

23. I designate pitches by note names, following a system based on A-440, which is called "-C." A semitone higher is called -C1, a minor third below -C1 is -Bb, etc. A tolerance of 1/4 tone is assumed.

24. *Herbert W. Myers, 15 Jun 1993.

25. Length calculations made by Herbert W. Myers.

26. *Herbert W. Myers, 30 April 1993.

27. Patrizio Barbieri ("Chiavette and Modal Transposition in Italian Practice [c. 1500-1837]," ***Recercare*** 3 [1991] : 5-79) gives a transcription of Adriano Banchieri's ***(Cartelha overo regole*** [Bologna, 1601] : 111-36) chart of the twelve modes subdivided into the three instrumental categories, with their appropriate clefs. ***Strumenti acuti are*** consistently at pitch and always in G2 clef. ***Strumenti acuti*** and

strumenti gmvi are, by the way, an octave apart, recalling Mersenne's grandand *petit choeur* (see Marc Ecochard, "Les hautbois decrits dan l'Harmonie Universelle de Mann Mersenne: Accord, Classification, Filiation," [unpublished draft, 1993, p. 20]). The division of instruments into three choirs is seen in a number of works by Italian composers contemporary with Banchieri (see Barbieri, "Chiavette," p. 69).

28. Cf. Praetorius, *Syntagma* 3, quoted in Steven E. Plank, "Praetorius on Performance: Excerpts from Syntagma musicum III," in this issue of *HBSJ.*

29. Barbieri, "Chiavette," p. 60.

30. Cited in ibid., p. 42. Cf. Thomas Morley, *A Plaine and Easie Introduction to Practical! Musicke* (1597; reprint, London, 1963): "Take an instrument, as a Lute, Orpharion, Pandora, or such like, being in the naturall pitch, and set it a note or two lower it will go much heauier and duller, and far from that spirit which it had before...."

31. Transl. Herbert W. Myers.

32. Barbieri, "Chiavette," p. 61.

33. Stephen Bonta, "Clef, Mode, and Instruments in Italy, 1540-1650" (unpublished paper), p. 11. Cf. also Viadana, cited in Andrew Parrott, "Transposition in Monteverdi's Vespers of 1610, an `aberration' defended," *Early Music* 12, no. 4 (1984): 498.

34. Cf. Eric Chafe, *Monteverdi's Tonal Language (New* York, 1992), Chapter Two, "Basic issues in seventeenth-century tonality."

35. Ecochard ("Les hautbois," p. 20) points out that Mersenne's description of recorders hints at the possibility of instruments with six-finger G and six-finger A, that is, instruments tuned a second apart.

36. * 29 May 1993.

37. Based on its characteristic maker's stamp.

38. Charles Foster, "The Bassanelli Reconstructed: A Radical Solution to an Enigma," *Early Music* 20, no. 3 (1992): 424.

39. See Haynes, *Pitch Standards,* section 3-1.

40. Ongaro, "Venetian," p. 396.

41. This organ (made by G.B. Facchetti, 1546) was replaced in 1937 (R. Lunelli, *Der Orgelbau in Italien [Mainz,* 1956], pp. 38ff.). Carl Ellis ("Nachwort des Ubersetzers" ["Translator's Afterword"] in Lunelli, *Orgelbau,* p. 211) gives calculations fora pitch of something more than a whole-tone below A-440, which must be different from its pitch when it was built.

42. Morsolino had worked with Lasso at Munich before going back to Cremona. See James Haar, "Munich at the Time of Orlande de Lassus," *Man d' Music: The Renaissance,* ed. Iain Fenton (Englewood Cliffs, New Jersey, 1989), p. 249. (Reference kindly supplied by Douglas Kirk.)

43. I have been advised by Douglas Kirk on information from Andrew Parrott that the "non" found at this point in the text as transcribed in Cesari & Pannain (and which renders the sentence nonsensical) does not exist in the original document.

44. Quoted in full in G. Cesari and G. Pannain, *Istitutioni e monumenti dell'arte musicale italiana,* vol. 6 (Milan, 1939), pp. xvi-xvii..

45. For a number of reasons, Morsolino must mean "semitone" for *tuon.* The question is treated in detail in Haynes, *Pitch Standards,* p. 60.

46. Praetorius' depiction of the mute is more than 13% longer than the curved cornett; a whole tone is about 12%. It is also about 5.6% longer than a good modern cornett that plays at A-440 (* Herbert W. Myers, 11 Feb, 15 Jun 1993).

47. E. Nickel, *Holzblasinstrumentbau,* pp. 338-41. The same entry is found in an inventory for the city dated 1598 (also possibly that of 1609, refered to as *I Secund Zincken).*

48. Anne Smith, "Die Renaissancequerflote and ihre Musik: ein Beitrag zur Interpretation der Quellen," *Basler Jahrbuch fiir historische Musikpraxis,* 2 (1978): 9-76; here 27.

49. Praetorius, *Syntagma* 2: 37, 41.

50. Of twenty-eight surviving specimens, seventeen (61%) are at this pitch; eight are at 430-435. See Haynes, *Pitch Standards,* Appendix 3.

51. Rainer Weber, "Some Researches into Pitch in the 16th Century with Particular Reference to the Instruments in the Accadmia Filarmonica of Verona," *Galpin Society Journal* 28 (1975): 8.

52. Listed in Smith, "Renaissancequerflote," pp. 56-57.

53. Praetorius, *Syntagma* 2: 16.

54. Smith, "Renaissancequerflote," 26.

55. The distinction of role was certainly not hermetic; the two types of cornett evidently overlapped functions occasionally. Dickey (* 27 Apr 1994) notes that there is music that calls for mute and curved cornetts together. Dickey is skeptical about the notion that a different pitch was associated with the mute cornett, and suggests that the material presented in Graph 2 may for several reasons (mainly insufficient data) give an inaccurate picture.

56. Cited in Oscar Misch lad, *L'organo della cattedrale di Feltre* (Bologna, 1981), p. 9.

57. Ibid., p. 74.

58. Barcotto elsewhere in this book uses tuono to mean "semitone," so its meaning is unclear here.

59. G.A. Bontempi ***(Historia musica*** [1695; reprint, Geneva, 1976], p. 188 reported that "gli Organi in Venetia di S.Marco... sono un tuono inter° piu acuti degli altri dell'altre Chiese...." This goes much further than Barcotto, however, who speaks only of "portatili." We may assume that St. Mark's was yet a whole tone above the ***tuono dei Cornetti.***

60. Antonio Barcotto, ***Regola e breve raccordo (Ms*** Bologna Cons C-80); cited in R. Lunelli, ***Collectanea Historicae Musicae*** 1 (Firenze, 1953): 142-55, art. 9.

61. Janowka, T.B., ***CLavis ad thesaurum magnae artis musicae*** (1701; reprint, Amsterdam, 1973), pp. 93-94; see also p. 315.

62. The translation of ***clarini humiliate*** is not certain, but ***humiliati*** means soft, and a document from Augsburg from the same period (19 Oct 1697) uses the expression "zwei Cornetisten oder Clarinisten" (cited in Markus Spielmann, "Der Zink im Instrumentarium ***des*** Suddeutsch-Osterreichischen Raumes 1650 bis 1750," Bernard Habla, ed., ***Johann Joseph Fux und die barocke Blikertradition.*** [Tutzing, 1987], p.128). The mute cornett would make sense in this context, being normally a tone lower than ***Chor=*** or ***Zinck=thon.***

63. Praetorius reserved the term ***CammerThon*** (although it had other names, such as ***rechte Thon*** and ***Cornettenthon)*** unambigously for the higher instrumental pitch.

64. Alessandro Poglietti, ***Compendium oder kurtzer Begriff, und Einfiihrung zur*** *Musica* (Vienna, 1676), p. 100.

65. J. Kuhnau, ***Gutachten iiber ek Freiberger Domorgel*** (1714), Staatsarch iv Freiberg, A all/I, 60a, Bl. 59f. Since 1983 at 476; earlier at 474, according to Frank Harald Greg ***(Die Klanggestak der Orgeln Gottfried Silbermannr*** [Leipzig, 1989], pp. 109-10) and Werner Lottermoser ***(Orgeln, Kirchen und Akoustik*** [Frankfurt, 1983], 2: 175 and 1: 41). ***Ricercar*** (RIC 113101) gives 467. In Haynes, ***Pitch Standards*** (Section 5-3b), I consider the relation between ***Cornet-ton*** and ***Chorton.*** The evidence I have found indicates that the former is conceived as a specific pitch level, while the latter is a more general concept (approximately equivalent to "church pitch") that often coincides with -Cl.

66. Werner Muller, ***Gottfried Silbermann, Personlichkeit und Werk*** (Frankfurt, 1982), pp. 54, 428; Greg, *Klanggestalt,* pp. 25, 111; Ulrich Dihnert, ***Historische Orgeln in Sachsen*** (Frankfurt, 1980), p. 114. The original pitch cannot be determined, although the restorers believe it is this one.

67. Felix Friedrich, ***Der Orgelbauer Heinrich Gottfried Trost: Leben, Werk, Leistung*** (Wiesbaden, 1989), pp. 47, 48, 129-30.

68. Restoration report.

69. A pipe is engraved ***Fkid cornet.*** Franz Bosken, ***Die Orgelbatierfamike Stumm*** (Mainz, 1960), p. 53; and idem, ***Quellen und Forschungen zur Orgekeschichte des Mittelrheins (Mainz,*** 1967), p. 329.

70. A pipe is marked Terz *Cornett ton.* Bosken, *Orgelbaufamilie,* p. 53; idem, Quellen, p. 302; Forster & Nicolaus (* November 1992).

71. Bosken, *Quelien,* p. 332.

72. A pipe is marked *Hohlpfeif Cornetton.* Bosken, *Orgelbauerfamilie,* p. 53; idem, *Quellen,* p. 387.

73. Bosken, *Quellen,* p. 392.

74. Restoration *Einweibung* program, 1986.

75. Rudolf Reuter, *Orgeln in Westfalen (Kassel,* 1965), p. 234.

76. Cited in Muller, *Silbermann,* p. 428.

77. A dispute about the pitch of the Domkirkes organ at Roskilde in the 1760s was resolved in much the same way: the instrument's maker and its organist proved "with the municipal Stadtpfeiffer, who appeared with 'cornetts and trombones,' that the pitch was correct" ("...durch den Stadtmusikanten, der mit "Zincken and Posaunen" erschienen war, clag die Tonhohe korrekt war"). Cor H. Edskes, "Zur Geschichte der Domorgel," in "Roskilde Domkirkes Orgel" (concert program, 1991), p. 15.

78. Johann Kuhnau, letter to Johann Mattheson, 8 December 1717, published in Johann Mattheson, *Critica M wica* 7 (1722): 229-39. Among the cornetts now in the possession of the Musical Instrument Museum of Karl Marx University in Leipzig are four curved trebles of the type played by the Stadtpfeiffer in the late seventeenth and early eighteenth centuries (catalogue numbers 1564, 1566, 1569 and 4030; apparently of Saxon origin, probably 16th-century, exact dating unsure; see Tarr, "'Catalog," pp. 136-38). They could be the instruments used by Kuhnau and Bach. All are at A-466. According to Herbert Heyde, three of the instruments belonged together originally, with four others now in other museums (Stadtisches Museum, Braunschweig 62, Historisches Museum, Basel 160, and Hohenzollern-Museum, Sigmaringen 4958 and 4959). The latter four are pitched at A-465, 460, 465, and 465.

79. Quoted from F.X. Mathias and *Jos.* Worsching, *Die Orgelbauer-Familie Silbermann in &a/burg* LE. (Mainz, 1966), p. 58; the text in Mendel, "Pitch in Western Music since 1500," p. 34, n. 23, is apparently corrupted.

80. * 1 April 1993.

Appendices

The entries are ordered by century (1st number), pitch (2nd number), and sounding length (= SL; in cm; 3rd number when present). Other data that are included (when known) are present location (a list of museums with their abbreviations can be found at the end of these appendices), museum number, maker's name, date (16C = 16th century, etc.), city of origin, country of origin, nominal pitch (given as a single letter), remarks, and information sources (bibliography also at end[1]). Brackets indicate information that is not secure.

Appendix 1. Italian curved cornetts (76)

16 434.60.6 Munich: DM 44598 16-17C ? A. Tarr gives in G at 485. Tarr 1981: 163.

16 438. 105.8 Verona: AF 13293. !! !! !! [? Bassano, A.], [? Venice], [?England]. C Tenor. Tarr gives C at 438, presumably with key. Weber considers a semitone lower than other cornetti in this collection, 410-415. Tarr 1981: 245.

16 438.64.1 Augsburg: M-M 3004. [? Italy]. A. Tarr 1981: 37.

16 440±. 59 Warwick: WM M 41. [? England/Italy]. A. Tarr 1981: 249.

16 445. 58.8 Verona: AF 13257. Early 16C, Italy. A Weber gives 410. Tarr 1981. 228.

16 445.61.8 Vienna: KHM 235 (C.246, 8592). 16C, Venice. A. Part of a set that includes also 232-34, all from Catajo (near Padua; owned by the Obizi family). The others are not in condition to give reliable pitches. Tarr 1981: 256.

16 450.57.7 Munich: DM 10185. HWK. 16-17C. I ? A Very unstable. Tarr 1981:162; McCann 1991: 35.

16 450. 59.1 Stockholm: MM 549. Late 16C. A. Tarr 1981: 222.

16 450. 60. Verona: AF 13266. [? !! !! (? Bassano, J.)], 16C [? Venice]. A. Weber gives 415 and notes that it is one half-step lower than the other cornetti in this collection. Tarr 1981: 237; Kirk 1989: 19.

16 452. 59.2 Bologna: MC 1780 (ex 36). Venice. A. v.d. Meer gives 450. Tarr 1981: 72; v.d. Meer iv.93.

16 457.56.7 Brussels 1203 ? A. Tarr 1981: 84.

16 458.58.6 Berlin: MM (ex Kanji) 5282. 16-17C. A. Impett gives 467 with small mouthpiece. Tarr 1981: 62.

16 462.44.2 Stockholm: MM 2287. D C'tino. Tarr 1981: 223.

16 463. 56. Stockholm: MM 173. [? Italy]. A. Bryant gives 474. Tarr 1981: 222.

16 463. 57.9 Vienna: KHM AR.3286. 16C, [? Italy]. A. Tarr 1981: 259.

16 464.57.2 Verona: AF 13268. !! !! [? Bassano, J.]. Venice. A. Weber gives 452. Tarr 1981: 239; Kirk, 1981: 19.

16 464. 57.5 Vienna: KHM 231 (A.242, 4077). Before 1596, Venice. A. From SchloS Ambras. Copied by J. McCann in 1981. Tarr 1981: 255.

16 465.41.395 Eisenach: BH Iv a 9. D C'tino. Tarr 1981: 109.

16 465. 57.2 Braunschweig: SM 63. !! !! [Bassano, J.], 1550-1600, Venice. A. Tarr 1981: 77.

16 465.57.4 Linz: OL 74. 16-17C, [Italy]. A. Tarr 1981: 143.

16 465. 57.5 Paris: E.580 C.626. 16C, Venice. A. Tarr gives pitch as 459 but SL indicates a pitch of about 469; McCann gives 465. Tarr 1981: 197; Kirk xi.93.

16 465. 57.8 Munich: SM 82-4 [? End 16C] ? A. Tarr gives [? 453]. Tarr 1981: 166; Kirk xi.93.

16 465.86.55 Braunschweig: SM 66. Late 16C, Venice. D Tenor. In excellent condition. Tarr 1981: 78.
16 466 54 Binningen: Buser. 1550-1600. A. Restored by R. Weber in 1975. Original case survives. Top 1/5 added to inst during restoration. Tarr 1981: 63; Tarr xi.92.
16 466.57.3 Vienna: KHM 230 (A.241, 4076). Before 1596, Venice. A. From Sch log Ambras. Tarr 1981: 253; Stradner 1987:110.
16 468.40.6 Bologna: MC 1777. ? D C'tino. Tarr 1981: 69.
16 469.56.5 Hamburg: MfHG 1924,202. !! [Bassano, H.], [Venice. A. Tarr 1981: 125; Kirk 1989: 19.
16 469.57.05 Paris: 977.10.2 (E.2203). 16C, Venice. A McCann gives 465; Tarr gives 469; Dickey gives 493. Tarr 1981:203; Kirk xi.93.
16 471. 56.6 Verona: AF 13270. 16C, Venice. A. Weber gives 452. Tarr 1981: 241.
16 471. 57 Hamburg: MfHG 1924,200. !! !! [Bassano, J.], [Venice]. A. Tarr 1981: 121; Kirk 1989: 19.
16 471. 57 Verona: AF 13271. Venice. A. Weber gives 452. Tarr 1981: 242.
16 471.57.6 Stuttgart: WL KK 99. A. From the Kunstkammer der Herzoge von Wurttemberg. Tarr 1981: 226.
16 471±. 57.05 Hamburg: MfHG 1924,201. !!!![Bassano, J.], Venice. A. Tarr 1981: 123; Kirk xi.93.
16 473. 56 Verona: AF 13264. !! !! [? Bassano, J.], Venice. A. Weber gives 452. Tarr 1981: 235; Kirk 1989: 19.
16 473. 57 Verona: AF 13267. !! !! [? Bassano, J.], Venice. A. Weber gives 452. Tarr 1981: 238; Kirk 1989: 19.
16 473. 58.2 Vienna: KHM 236 (C.247, 8593). !! !! [? Bassano] 16C, Venice. A. From Catajo; probably from the same workshop as 230 and 231. Tarr 1981: 257; Kirk xi.93.
16 474. 43.3 Vienna: KHM GdM 206. D C'tino. Using MP from 230. Tarr 1981: 257.
16 474. 55.7 Hamburg: MEHG 1924,204. [Venice]. A. Tarr 1981: 129.
16 476. Augsburg: M-M 3003, 2d half 16C. D Tenor. Tarr reckons in C, presumably with key. Weber puts in D at 420. Tarr 1981: 35.
16 476. 54.7 Brussels: MC 1209. !! [Bassano, H., Venice]. Tarr 1981: 87; Kirk 1989: 19.
16 476. 55 Hamburg: MfHG 1924,203. !! !! [? Bassano, J.], [Venice. A. Tarr 1981: 127; Kirk 1989: 19.
16 476 57 Verona: AF 13272. [Venice]. A. Weber gives 452. Tarr 1981: 241.
16 478. Verona: AF 13294. !! !! !! [? A. Bassano], ? Venice,[or England]. D Tenor. Tarr gives in C, presumably with key. A whole-tone above 13293. Tarr 1981: 246.
16 480. 55.8 Verona: AF 13291. Italy. A Weber gives 456. Snake form. Tarr 1981: 244.
16 482.55.7 Bologna: MC 1785. !! !! !! [? Bassano], Venice. A. Kirk thinks possibly English. v.d.Meer gives 476. Tarr 1981: 70; Kirk 1989: 19; v.d.Meer iv. 93.
16 482.56.3 Bologna: MC 1784. !! !! [? Bassano, J., ? 16C, ?Venice]. A. v.d.Meer gives 456 *[sic]*. Tarr 1981: 69; Kirk 1989: 19; v.d.Meer iv.93.
16 482. 57.2 Verona: AF 13265. !! [? Bassano, J.], 16C, Venice. A. Weber gives 452. Tarr 1981: 236; Kirk 1989: 19.
16 482.57.5 Augsburg: M-M 3005. 1550-1600.A. Weber (who restored it in 1969) gives 464. Tarr 1981: 39.
16 482.57.4 Bologna: MC 1784. Venice. A. Tarr 1981: 69.
16 484.56.1 Stuttgart: WL KK 98. A. From the Kunstkammer der Herzoge von Wurttemberg. Tarr 1981: 224.

16 488. 52.45 Braunschweig: SM 61. Mid 16C, Venice. A. Tarr et al give A-465 but SL indicates much higher: McCann gives almost 490. Tarr 1981: 76; Kirk xi.93.
16 490.55.67 Lubeck: SAM 35878. A. Used by Turmers at St Marien, Mandischer. Tarr 1981:152.
16 493.53.6 Verona: AF 13269. !! !! [? Bassano, J.], Venice. A. Weber gives 468. Tarr 1981: 240; Kirk 1989: 241.
16 494. 69.5 New York: MM 89.4.2142. [16C?], D Tenor. Tarr gives in Eat 440. Tarr 1981: 170.
16 504. 84 Verona: AF 13290. [Before 1585] D Tenor. Tarr gives 484; Weber gives 452; Kirk gives 501-507. Tarr 1981:243; Kirk xi.93.
17 415. 106 Paris: E.578, C.633. Begin 17C. ? C Tenor. Tarr 1981: 197; Kirk xi.93.
17 435.61.6 Linz: OL 73. [17C; ? Italy]. A Tarr 1981:143.
17 435. 92.5 Paris: 979.2.22. [? 17C, England/Italy ?]. D Tenor. Tarr 1981: 208.
17 440+. 43.1 Linz: OL 70. D C'tino. "Etwas h8her als 440 (McCann: "Mundstuck urn 1,00 gezogen)" [Somewhat higher than 440 (McCann: mouthpiece pulled out 1.00 cm)] Tarr 1981: 142.
17 445.42.7 Paris: 979.2.18 [? 17C] I ? D C'tino. Tarr 1981: 204.
17 447.41.9 Salzburg: CA 21/1. D C'tino. Tarr 1981: 219.
17 450. 56.7 Paris (ex Chambure): 979.2.30. [? 17C, ? Italy]. A Tarr 1981:213
17 450. 59.4 Paris: E.137 C.627. [? 17C] . A. Al most straight; made from single piece [sic.] . Tarr 1981: 194.
17 460.41.7 Paris: E. 0. D C'tino. Tarr 1981: 192.
17 460. 57.7 Paris: E.136 C.628. A. Tarr 1981: 192.
17 464.42.2 Basel: HM 1879.55. D C'tino. Tarr 1981: 45.
17 464. 57.7 Paris (ex Chambure): 979.2.27. [? 17C, Italy]. A. Tarr 1981: 211.
17 465. 57.8 Nuremberg MIR 42. A. Tarr 1981: 184; Kirk xi.93.
17 470 57.7 Munich: SM 82-1. c1600, [? Italy]. A. Impett gives 474; Nicholson 466. Original case preserved. Tarr 1981: 164.
17 471. Paris (ex Chambure): 979.2.16. [? 17C, ? Italy]. A. Tarr 1981: 203.
17 471. 55.6 Salzburg: CA 21/2. A. Tarr 1981: 219.
17 471.56.8 Paris: E.139 C.631. A. Dickey gives 493, J.-P. Canihac 466. SL indicates a pitch ofabout 471. Tarr 1981: 195.
17 487. 37.9 Paris: 979.2.25. D C'tino. Tarr reckons in Eat 433. Tarr 1981: 210.
17 487.54.5 Lubeck: SAM 1981/95. c1600. A. Tarr 1981: 154.
17 490.52.6 Paris (ex Chambure): 979.2.31. [? 17C]. A. Lower octave slightly wide. Taff 1981: 214.
18 464±. 39 Munich: BN 98 [K.46]. 1700/1709. ? D C'tino. Tarr 1981: 156.

Appendix 2. German curved cornetts (23)

16 450.58.2 Berlin: MM 54. [MS; ? Matthias Schnitzer], 16-17C, [? Germany]. A. Impett gives 455. Tarr 1981: 54.
16 460. 57.7 Berlin: MM 3065. 16-17C, [? Germany]. A. Impett gives 467 with smaller MP. Tarr 1981: 59.
16 460. 58.2 Vienna: KHM GdM 207. [? Germany]. A. Tarr 1981: 258.
16 465.42.6 Sigmaringen: HM 4959.1K [? Saxon]. D C'tino. McCann makes longer than 4958 *[sic]*. Tarr 1981: 221; McCann 1991: 36.
16 465.432 Nuremberg MI 122. 16-17C G D C'tino. Tarr 1981:180; Kirk ix.93.

16 466. 57.1 Leipzig: 1566. IW. [? Germany]. A 3 curved descants, 1563-65, are not in condition to be used; the first 2, Saxon, probably in D at 466, the 3d in D at ?440. Tarr 1981: 136.
16 466.57.7 Leipzig: 1569. IKH. [? Germany]. A. Tarr 1981: 138; McCann 1991: 37.
16 470. 58 Berlin: MM 662. [16C]. A. Impett gives 473-74. From the instrumentarium of the Wenzelskirche, Naumburg. Tarr 1981: 58.
16 480-± 56.9 New York: MM 52.96.1. Late 16 - early 17C, [? Germany]. A. Tarr 1981: 174.
17 460±. 58.4 Oxford: Bate 500. [? c1600, Germany]. A. Tarr 1981: 185; McCann 1991: 38.
17 465.42.85 Sigmaringen: HM 4958. IK [? Saxon]. D C'tino. Tarr 1981: 221; McCann 1991:36.
17 465.56.7 Braunschweig: SM 62. [IKH ?], c1600. A. Tarr 1981: 76; McCann 1991: 34.
17 465±. Brussels 1187 HWK. [? 1st half 17C]. D C'tino. McCann 1991: 33.
17 466.42.4 Leipzig: 1564 IK Saxon. D C'tino. Tarr 1981: 136; McCann 1991: 37.
17 466.43.1 Leipzig: 4030 IK Saxon. D C'tino. Tarr 1981: 138; McCann 1991: 38.
17 471. 58.2 Bonn: B-H 2. A. Tarr 1981: 73.
18 460.56.8 Munich: BN Mu 101 [K.48]. [Late 18 or 19C] , near Stuttgart, Germany. A. Resembles a traverso; has one key. Tarr 1981: 158.
18 460. 58.1 Basel: Private. Paulus, C.F., 18/19C, Neukirchen, Germany. A. Resembles a traverso. Tarr 1981: 50.
18 460.59.4 Lubeck: S-M 1893/59. 1742. Germany. A. Kirk notes, "lowered from Chorton to near 440." Tarr 1981: 150.
18 469. 56.5 Gottingen: SMwsS 273. HGH, 1794. A. Tarr 1981: 113.
18 476. 57.6 Stuttgart: WL 1981-76. Thoma, W., mid-18C, Bayreuth, Germany. A. Resembles a traverso. Tarr 1981: 227.
19 465±. 57.6 Winston-Salem, NC: WM M Z-102. Gutter, 1805, Neukirchen, Germany. A. These two instruments were ordered directly from the maker. Tarr 1981: 261.
19 465±. 58.2 Winston-Salem, NC: WM M Z-102. Gutter, 1805, Neukirchen, Germany. A. 3-part. Tarr 1981: 260.

Appendix 3. Mute cornetts (28)

16 411.69.3 Verona: AF 13262. !! !! [? Bassano, J.], Venice. A. Weber gives 452 [presumably in G]. Tarr 1981: 234; Kirk 1989: 19.
16 415.66.2 Vienna: KHM 225 (A.236, 4065). A. From SchlogAmbras. Tarr gives 439. Tarr 1981: 252; Stradner 1987: 111.
16 417.69.5 Verona: AF 13263. !! !! [? Bassano, J.], Venice. A. Weber gives 452 [presumably in G]. Tarr 1981: 235; Kirk 1989: 19.
16 425.65.3 Verona: AF 13259. !! !! [? Bassano, JJ,Venice. A. Weber gives 450. Tarr 1981: 232; Kirk 1989: 19.
16 430.65.1 Brussels: MC 1192. !! !! [? Bassano, J., Venice]. A. Weber (who restored it in 1974) gives 465 [presumably in G]. Tarr 1981: 82; Kirk 1989: 19.
16 430.73.8 Verona: AF 13261. !! !! [? Bassano, J.], Venice. Weber gives 413; o ne-half step lower than the other mute cornet in this collection. Tarr 1981: 233; Kirk 1989: 19.
16 435. 64.95 Leipzig: 1559. !! [Bassano, H.], [16thC, Venice, Italy]. A Tarr 1981:134; Kirk 1989:19.
16 435. 65.15 Leipzig: 1560. !! [Bassano, H.], [Venice]. A. Tarr 1981: 134; Kirk 1989: 19.
16 439. 63.6 Verona: AF 13256. 16C, Venice. A. Weber gives 468. Tarr 1981: 228.

16 439. 64 Vienna: KHM 228 (C.239, 8587). !! !! !! [? Bassano, Al, Venice. A. From Catajo. Tarr 1981: 253.
16 439. 64.9 Vienna: KHM 226 (C.237, 8585). !!!!!! [? Bassano, A.], Venice. A. From Catajo (near Padua; owned by the Obizi family). Tarr 1981: 252; Kirk 1989: 19.
16 439. 64.9 Vienna: KHM 227 (C.238, 8586). !! !! [? Bassano, J.], Venice. A. From Catajo. Tarr 1981: 252.
16 439. 65 Verona: AF 13258. !! !! [? Bassano, J.], Venice. A. Weber gives in G at 452. Tarr 1981: 231; Kirk 1989: 19.
16 442.64.65 Augsburg: M-M 3007. ? Venice]. A. Weber (who restored it in 1968) gives in A at 420. Tarr 1981: 41.
16 442.64.8 Augsburg: M-M 3006. [? Venice]. A. Weber (who restored it in 1968) gives in A at 420. Tarr 1981: 40.
16 442. 66.1 Vienna: KHM 229 (C.240, 8588). Venice. A. From Catajo. Tarr 1981: 253.
16 445.72. Leipzig: 1562. HIER.S; Fag e; [16th C, Venice]. G. Tarr 1981:134
16 445 72.25 Leipzig: 1561. HIER.S; Eagle; [16th C, Venice]. G. Tarr 1981: 134.
16 453-58.59.1 Vienna: KHM 223 (A.234, 4066). [? Italy]. A. From Schlog Ambras. Stradner gives 465. Tarr 1981: 251; Stradner 1987: 110-11.
16 454.58.9 Vienna: KHM 221 (A.232, 4063). [? Italy]. A. From SchlogAmbras. Stradner gives 465. Tarr 1981: 250; Stradner 1987: 111.
16 466. 58.9 Vienna: KHM 222 (A.233, 4064). [? Italy]. A. From Schlog Ambras. Tarr 1981: 251; Stradner 1987: 111.
16 466.58.9 Vienna: KHM 224 (A.235, 4067). [? Italy]. A. From Schlog Ambras. Tarr 1981: 251; Stradner 1987: 111.
16 469. 43.05 Vienna: KHM 220 (A.231,4068). [? Italy]. D C'tino. From Schlog Ambras. Tarr 1981:250.
16 480.43. Vienna: KHM 219 (A.230,4062). [? Italy]. D C'tino. From Schlog Ambras. Tarr 1981: 250.
16 493. 54.7 Berlin: MM 302. Schnitzer, Sigmund/Arsazius, 1500-50, Nuremberg/Munich, Germany. A. Tarr 1981: 55.
17 409. 65 Berlin: MM 661. [? mid 17C], [? Italy]. A. Impett gives in G at 461. From the instrumentarium of the Wenzelskirche, Naumburg. Tarr 1981: 57.
17 443. 64.8 Bologna: MC 1770. !! !! [? Bassano, J., ? 17C, ? Venice]. A. Tarr 1981: 66; Kirk 1989: 19.
17 446. 64.5 Hamburg: MfHG 1924,205. c1600, Germany or Italy. A. Tarr 1981: 130.

Collections:

Augsburg: MM	Maximilian Museum
Basel: HM	Historisches Museum, Sammlung alter Musikinstrumente
Berlin: MM	Musikinstrumentenmuseum des Stasatlichen Instituts fur Musikforschung
Beningen: Buser	Ernst Buser (private collection)
Bologna: MC	Museo civico
Bonn: BH	Beethoven-Haus
Braunschweig: SM	Stadtisches Museum

Brussels	Musee Instrumental
Eisenach: BH	Bachhaus
Gottingen: SMwsW	Stadtmuseum/Musikwissenschaftlisches Seminar der Universitat
Hamburg: MfHG	Museum fur Hamburgische Geschichte
Linz	Schlossmuseum
Lubeck: SAM	St. Annen Kloster Museum
Munich: BN	Bayerisches Nationalmuseum
Munich: DM	Deutsches Museum
New York: MM	Metropolitan Museum of Art
Nuremberg	Germanisches Nationalmuseum
Paris	Musee du Conservatoire
Salzburg: CA	Museum Carolina Augusteum
Sigmaringen: HF	Fiirstlich-Hohenzollernschen Schloss
Stockhom: MM	Musikmuseet
Stuttgart: WL	Wurttembergisches Landesmuseum
Verona: AF	Accademia Filarmonica di Verona
Vienna: KHM	Kunsthistorisches Museum, Sammlung alter Musikinstrumente
Warwick: W. Museum	Warwickshire Museum
Winston-Salem, NC: Wachovia	Wachovia Museum

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NOTES TO APPENDICES 1-III

1. As will be clear from the entries, most of this list is derived from Tarr 1981.

2. Lasocki (1983) suggested a connection between the large number of instruments with one to three pairs of "rabbit ears" or exclamation marks (!!) and the Bassano family. Kirk (1989: 19) reported a study of all the instruments bearing these marks and proposed that instruments marked !! were by Hieronymous Bassano at Venice, those with !! !! were by his son Jacomo and/or Santo Griti, and and those signed !! !! !! were made by members of the English branch of the family (Arthur and Anthony II).