

208. Beaussant 1992:128.
 209. Cf. the next section, 2-7.
 210. See Haynes 2001:56-59.
 211. Tr. based on Crookes 1986.
 212. Vienna and Prague were connected both politically and culturally as parts of the Habsburg sphere. Antonicek (1980:19:716) wrote "Ferdinand II made Vienna his capital and place of residence, although neither he nor later monarchs liked to reside there permanently; other towns such as Prague, Regensburg . . . and Graz shared Vienna's reputation as one of the places where the imperial Kapelle gave outstanding performances."
 213. To distinguish this pitch from the northern *Chorton* at A+1, I will write this southern name for the lower pitch as "*ChorThon*."
 214. Senn 1974:39.
 215. Mandorfer 1977:29.
 216. Ardal Powell (*).
 217. Kite-Powell 1997:5. See also Campbell 1995 (who believes the dialect used in the text indicates a south-German or Austrian provenance).
 218. Haspels 1987:123.

Chapter 3

The Instrument Revolution and Pitch Fragmentation, 1670-1700

While France was emerging as a strong power and cultural role model, Germany and England in 1670 were just recovering from the devastations of long wars. All over Europe, musical institutions were being reorganized and were ready for changes, and French music was in vogue.

There were also urgent reasons for a number of French musicians to move out of France. One was the virtual expulsion of all Protestants in 1685 by the French government (through the revocation of the Edict of Nantes); many Protestants, especially in Poitou, were woodwind players and makers. The other reason was Lully's monopoly of power within the musical sphere, which by the 1670s was so oppressive that it forced a number of musicians to leave for other courts.

The new French strings and woodwinds, playing at lower pitches, quickly spread all over Europe. They were adopted in London, Turin, Amsterdam, and Madrid by the 1670s, at various German courts and cities by the 80s, and at Venice and Vienna by the 90s.¹ By the 1680s, French woodwinds were being made in Holland and England, and by the 1690s, in Germany.

The first French instruments to arrive in foreign lands were naturally at the usual French pitches: *Ton d'Opéra* at A-2, *Ton de la chambre du Roy* at A-1½, and *Ton d'Écurie* at A+1. When organs at their traditional pitches were combined with the new instruments, transposition was sometimes necessary. In some cases, accommodation was easy; *Ton d'Écurie* at A+1 was known in Germany as *Cornet-ton*, and in Italy

in this period, as *Corista di Lombardia*. In London, French *Ton de la chambre du Roy* at A-1½ coincided with English *Consort-pitch* at Q-3.

3-1 France

3-1a *Ton d'Opéra* (A-2)

Indications in this period of the connection between the name *Ton d'Opéra* and the frequency A-2 are sparse. Loulié wrote of recorders pitched at *Ton d'Opéra* in 1696 (77). Recorders survive at A-2 by Dupuis, Rippert, and L. Hotteterre; they were probably made in this period.² There is also a pitchpipe made by "Dupuy" (Dupuis?) at 391.³

Many other French woodwinds were made in the course of the 18th century with an average pitch of ±390. *Ton d'Opéra*, as we will see below, was regularly considered the lowest pitch in France until late in the 18th century. Since it is also the lowest observable woodwind pitch, a connection between the two is implicit.

At the end of the 17th century, A-2 or *Ton d'Opéra* was also called *Ton de Chapelle*. The acoustician Joseph Sauveur wrote of the two in the singular, as one (approximate) level: "Musicians consider the reference note to be C, which is *Ton de Chapelle* or *Ton d'Opéra* . . . this frequency is not precisely determined . . ." And Bernard le Bovier de Fontenelle did the same: "If there is no fixed frequency, one has to rely on *Ton de Chapelle* or *Ton d'Opéra*, which is defined only approximately."⁵ That the two pitches could have been at the same frequency but distinguished by name probably had to do with their separate functions. Instruments and churches were long kept separate in France by the *Caeremoniale Parisiense* of 1662,⁶ a strict ecclesiastical code that discouraged the use of orchestral instruments in church through much of the 17th century. Le Cerf de la Viéville reported that Campra was the first to introduce violins in church in about 1680 at Nôtre-Dame.⁷

Charpentier used instruments extensively in his sacred works written in the 1670s through 1690s, but the circumstances may have been exceptional, as most of his patrons were independent of the normal

government of the Church. From 1688 to 1698, Charpentier worked at the Jesuit church of St. Louis in Paris, and it is conceivable that he regularly used instrumentalists from the Opéra; we know singers from the Opéra sang there, and that the instrumentalists were "parmi les meilleurs de Paris" ("among the best in Paris").⁸ Many of the pieces Charpentier wrote in this period include instruments,⁹ and would thus probably have been performed at A-2.

3-1b *Ton de la Chambre du Roy* (A-1½)

In 1701 Sauveur wrote of "the differences between *Ton de Chapelle*, *Ton d'Opéra*, and the pitch of private concerts."¹⁰ Sauveur makes a distinction between *Ton de Chapelle*/*Ton d'Opéra* and the pitch for "des Concerts particuliers," which sounds like a chamber pitch. In 1703 Brossard also seems to have distinguished a *Ton de la chambre du Roy* used in the "Chambre du Roy," a *Ton de Chapelle*, and a *Ton de l'Opéra*.¹² Loulié in 1696 also used the term *Ton de la Chambre*.¹² And as we saw in 0-1c, Muffat spoke of two common French instrumental pitches: "The pitch to which the French usually tune their instruments is a whole-tone lower than our German one (called *Cornet-ton*) and in operas, even one and a half tones lower."

The first mention of a "chamber pitch" different from *Ton de Chapelle* is a remark published in 1683 by one of the royal chapel organists, Guillaume-Gabriel Nivers, in his *Dissertation sur le chant grégorien*. Nivers wrote:

By organs, I mean those at the pitch of the Royal Chapel, which is also that of all the best-known organs of Paris and elsewhere: this is why this pitch is called "*Ton de Chapelle*," to distinguish it from the "*Ton de la Chambre du Roy*," which is a semitone higher. . . . The latter pitch is normal (or should be so) for convent organs, since the range of the female voices is usually somewhat higher than an octave above the average male voice.¹³

Nivers' wording makes a categorical distinction between *Ton de Chapelle* and *Ton de la Chambre du Roy*. Since he placed *Ton de la Chambre du Roy* a semitone higher than organs, which were at A-2, it seems

Nivers was giving a name to the pitch Muffat had identified as the one "to which the French usually tune their instruments."

Describing pitches in semitones is of course somewhat approximate, and if we look at other evidence from the period, it looks as if the semitone between *Ton de Chapelle* and *Ton de la Chambre du Roy* was pretty narrow, so that the pitch to which the French "usually tuned their instruments" was rather lower than generic "415."

First, there is the evidence of the surviving French instruments of this time, which are at A-2 but rarely at A-1. Looking at Graph 13, if we except the four higher pitches in the period after 1730,¹⁴ the extremes of pitch in French woodwinds are virtually identical between 1670 and 1770. The range is 382 to 417 Hz, which is bigger than a semitone; at least two pitch centers must therefore have been involved. If we divide the frequencies down the middle, 382-400 and 401-417, the averages of each are 393 and 409.¹⁵ These could be regarded as the centers of the two separate pitch standards. The difference between them is only 69 cents, which to the ear still sounds like a semitone.

It may seem like quibbling to distinguish between 409 and 415 (A-1), but 409 is an average, and another look at Graph 13 shows how relatively few of the surviving instruments built before 1730 are above 410. If 415 had been an important pitch standard, there would be more surviving woodwinds at that general frequency, and some examples above it.

As for organs, other than the most common level, A-2, organs built in France in the period 1670-1700 are pitched as follows:

406	Lorris-en-Gâtinais, probably between 1607 and 1681
410	Le Petit Andely, St. Sauveur (Ingout/Quesnel, 1674)
408	Tarbes, Cathedral (Delaunay, 1682)
408	Roquemaure-du-Gard (Frères Jullien, 1690)
407	Lille, St. Maurice (M. Le Roy, 1711) ¹⁶

This works out to an average of 408.

Next is the evidence of a pitchpipe preserved at the Musée des Instruments at Paris. It records two pitches: written on the pipe's piston are "Ton de l'opera" (at A-394) and "Plus haut de la chapelle a versaille" (at A-407).¹⁷ Here, too, is the distinction between opera and court pitch. Since the organ in the chapel at Versailles was finished in

1711, this pitchpipe was presumably made after that date. It is not certain that these pitches are exact, but the relation between them is probably accurate (i.e., an interval of 57 cents). If "Ton de l'opera" was actually 393 (as attested by surviving woodwinds), then the pitch of the Versailles chapel would have been 406, very close to the level found on the higher group of contemporary woodwinds and organs. We will see below that the King had his church organs tuned up to his court pitch, so Versailles chapel pitch was probably the same as *Ton de la Chambre du Roy*.

A-1½ was also described as a pitch standard by the physicist Joseph Sauveur (1700:131), and probably for chamber music, since it was the pitch of a harpsichord. The frequency, accurate to within a few percent, was 404 Hz.¹⁸ Sauveur's later measurements of a harpsichord pitch in 1713 produced the same frequency.¹⁹ In 1713 he reported that he had measured organ pipes "chez le sieur Deslandes très-habile Facteur d'Orgue"²⁰ at the equivalent of about A-406.²¹

Thus the frequency of *Ton de la Chambre du Roy* was probably about 404-409 Hz, only about 60 cents higher than *Ton d'Opéra*, enough to be considered a semitone but not a full 100 cents above it. There was of course no reason for the two pitches to have been in a transposing relationship of an exact semitone (in fact, even had they been a semitone apart, transposition would have been impractical in the general tuning schemes of the period based on meantone).

The king to whom *Ton de la Chambre du Roy* referred was Louis XIV, as it was the primary French instrumental pitch of his reign, used at court and for the royal organs. It is observable in France from about 1680 and extended as far as 1800, but probably was predominant only until the 1720s (Louis died in 1715). After 1780, A-1½ seems to have become the favored pitch at the Opéra (see 8-2b). The same frequency was dominant in England from at least the 1670s (and perhaps long before) until about 1730, and was probably the level known as *Consort-pitch* (see Graph 15b, c, and d). In Germany, it existed as a species of *tief-Cammerton* (see 5-6b). It was apparently still being used at Salzburg in Mozart's day.²² As can be seen in Graphs 14, 16, and 17, it was a significant pitch in Germany, the Dutch Republic, and the southern Netherlands.

3-1b1 Organ Pitch and the "Louis XIV Parenthesis"

The prevailing court *Ton de la Chambre du Roy* apparently affected organ pitch in the royal chapels. While there was a general ban on figural instruments in churches, the royal *Chapelle* employed concerted music from the 1660s.²³ That was possible because music in the *Chapelle* was governed separately from churches in the rest of France.

At court, the various musical groups were often combined, and royal wind players, carrying the pitches of their instruments, played in the chamber, the chapel, in ceremonial music, and in the theater.²⁴ This constant intermixing implies that pitch at court was at a single level. If *Ton de la chambre du Roy* was the preferred pitch of the players, organ pitch at Versailles and the other royal residences would have to have been raised to match it.²⁵

And indeed, there is documentation of this process. Alexandre Thierry, organ maker to the King, requested payment on 10 July 1687 "for having raised the pitch of the chamber [organ] and that of the chapel [at Les Invalides], for [raising] another at Fontainebleau and the chamber organs I am presently making, for [raising the pitch of] the Saint-Cyr organ and others, orders I have carried out for [Mgr Louvois] . . ."²⁶

One of the organs Thierry raised was at the famous convent of Saint-Cyr. Nivers, writing just a few years before this, had pointed out that *Ton de la Chambre du Roy* was a more appropriate pitch for convent organs. It may well have been Nivers himself who requested that the Saint-Cyr organ be repitched, as he was music master there from 1686 (the year before Thierry's note).

Although Louis XIV had his organs raised from their original pitches (*Ton de Chapelle* at A-2) to *Ton de la Chambre du Roy* (A-1½) in the 1680s,²⁷ after his death they were all gradually restored to *Ton de Chapelle*, like other organs in the kingdom. The organ expert Pierre Hardouin calls this the "Louis XIV parenthesis." Hardouin wrote in 1963 "Between the beginning of the 18th century and the end, *Ton de Chapelle* in France went down, therefore, about the amount of a semitone. But this appearance is deceptive, because it was in fact a return to a former situation—say, that of 1660, and moreover, the pitch raised to B natural [A-1/A-1½] was not rampant everywhere . . . It seems plainly linked to the strong influence of the King's musicians."

The Versailles chapel organ is an example of this process. The pitchpipe mentioned above, probably tuned to this organ shortly after it was completed in 1711, gave its pitch as A-407 (A-1½). Yet Ellis (1880:36) reported the pitch of this organ (based on a fork that was claimed to represent it in 1789) as 396 (= A-2). The reason for this apparent discrepancy is probably that the Versailles organ was originally built at *Ton de la Chambre du Roy*, = A-1½, and only later lowered to A-2 (probably during the restoration of 1762).²⁸ Hence the pitch reported by Ellis.²⁹

Another example of a temporary pitch rise in organs is François Couperin's organ at St. Gervais. Built in 1601 by Langhedul at A-2, it was raised a semitone in 1676 by Thierry. In 1768 (long after Couperin's death), it was reconstructed by Bessard and Clicquot, at which time Hardouin thinks it was lowered to its original early 17th-century pitch of A-2.

Support for Hardouin's hypothesis is the fact that organs built before 1670 and after 1700 were often pitched between 390 and 400, whereas the last three decades of the 17th century saw almost all organs built at higher pitches (see Graph 19a-c). There is also evidence of organs lowered a semitone to A-2 in the second half of the 18th century. St. Pierre des Chartreux at Toulouse was lowered to A-2 in 1750-60, and many newly built organs, such as those of Dom Bedos, were at that pitch. There is in fact already a prevalence of organs at A-2 after 1700, suggesting that the "Louis XIV parenthesis," like the glory-days of court musical activities, was relatively short-lived.

It is interesting to note that since the court, including its organs, was at *Ton de la Chambre du Roy* at A-1½, it seems that all Couperin's music with organ, written either for St. Gervais or for the royal organs, as well as all his chamber music written for the court, was conceived at A-1½. The same is probably true of all the music associated with the court in Louis XIV's lifetime.

3-1b2 The Coexistence of *Ton de la Chambre du Roy* and *Ton d'Opéra*

According to Muffat, *Ton de la chambre du Roy* was the level at which the French usually tuned their instruments. In other words, it was the primary French instrumental pitch from sometime before the 1660s

(when Muffat was in Paris) until at least 1698 (when he published this comment). He also expressed a personal preference for it over *Ton d'Opéra* at A-2 (see 0-1c).

Ton de la chambre du Roy would not have appeared out of thin air; to be accorded its primary role, it must have had an important history. Nothing is yet known of that history; precedents for A-1½ include most surviving Renaissance tenor flutes and the organ at Lorrain-en-Gâtinais, whose pitch may date from 1501 (but is probably 17th-century³⁰).

While *Ton de la chambre du Roy* at A-1½ prevailed at court, A-2 was maintained at the Opéra because it was important for voice ranges, particularly the *haute-contre*, which was a high tenor chest-voice like a contralto that extended upwards often as far as g1 or even a1 at A-440, about a third higher than the regular tenor; this was not the falsetto (or head-register) voice that came to be called "countertenor" in the 20th century. The principal male role in eight of Lully's 14 operas was for *haute-contre*. Raising the pitch would probably have made these roles unsingable.

In any case, after Lully's death the Opéra had become an institution dedicated to preserving a French national tradition, thus inherently conservative. As late as the 1770s, Burney wrote,

The style of composition is totally changed throughout the rest of Europe; yet the French, commonly accused of more levity and caprice than their neighbors, have stood still in music for thirty or forty years: nay, one may go still further, and assert boldly, that it has undergone few changes at the great opera since Lully's time, that is to say, in one hundred years.³¹

Where two pitch standards functioned side by side like this, were they used by different players, and was one associated with Paris and the other with Versailles? In both cases, the answer is apparently no.

Location was not an issue. The court musical establishment did not officially move from Paris to Versailles until 1683, the same year Nivers described *Ton de la Chambre du Roy* as a semitone higher than *Ton de Chapelle*. The distinction between the pitches was thus already valid when both were used at Paris. (And indeed, Nivers made clear that *Ton de Chapelle* was then the pitch of the "Chapelle du Roy" as well as

"the best-known organs of Paris and elsewhere.") The bill Alexandre Thierry presented to the king for raising the pitch of royal organs was dated four years later, in 1687. The pitch distinction was thus one of function, not place.

It is also clear that there was no systematic demarcation of personnel between the court music and the Opéra. It is true that as part of the order establishing the Opéra (the Académie Royale de Musique), the King had explicitly forbidden Lully from using royal musicians at the Opéra in Paris. His *Permission* of 27 June 1672 contained the phrase "Nor in the performance of these pieces may he make use of musicians in our employ . . ." ³² Despite this, royal musicians sometimes had leading parts in the productions Lully performed at court.³³ At least 18 wind players, many of them prominent in the service of the court, took part in Lully's productions at Saint-Germain-en-Laye in the 1670s and 80s.³⁴ By the turn of the century, a number of wind players (Julien Bernier, Jean Rousselet,³⁵ the Chédeville brothers, and later Jean-François Despréaux, François Bureau, and Nicolas-Benigne Monnot) combined careers at the Opéra with active court appointments.³⁶ Playing at both the court and the Opéra, these players would have been obliged to use different instruments or setups, rather like the British woodwind player at the beginning of the 20th century described by Baines (1957:50), who "had to possess two instruments, one sharp-pitch, the other flat-pitch, and when engaged for a concert was notified which to bring."

11c *Ton d'Écurie* (A+1)

The other pitch standard that survives on French flutes is A+1. We speculated in the last chapter that this level was called *Ton d'Écurie*. There are a dozen recorders made between about 1670 and 1730 by the Hotteterres and Rippert,³⁷ and a traverso by Lissieu with an average pitch of 461-62. It is possible that all these instruments were made before 1700.

There are two ways to look at instruments at A+1: we can take them at face value. Or, by switching their nominal pitch upward a step (i.e., turning F-flutes into G-flutes, C-hautboys into D-hautboys, etc.), they can be regarded as pitched at A-1.

But there is no sign that musicians of the time thought in this way. It is our generation that assumes a single pitch standard and looks at instruments that do not fit it as "transposing" (B \flat -clarinets, F-horns, etc.). Among the sources of the time that indicate the name of the lowest note, it is consistently c $_1$ for the hautboy (Talbot ca.1692-95, Freillon-Ponçein 1700, Hotteterre 1707), and f $_1$ for the recorder (Loulié ca.1685, Freillon-Ponçein, Hotteterre).³⁸ There is also documentation of hautboys (and indeed violins) in Cornet-ton (A+1).³⁹ Since the concept of multiple pitch standards was common, we may assume that the instruments in question were indeed thought of as pitched at a higher standard. (This surely did not prevent players from using them as "transposing" instruments, however, when the need arose.)

3-2 England

3-2a French Influences on Instrumental Pitch at the Restoration

At the Restoration in 1660, when Charles II returned to London, surviving musicians who had been in royal service before the war broke out in 1642 were reappointed.⁴⁰ The 17 to 20 positions in the royal "Wind musick" were on traditional instruments (cornett, dulcian, flageolet, flute, recorder, shawm, and sackbut).⁴¹ The *Broken Consort*, also a continuation of a group from before the war, "may initially have played prewar fantasia suites until new music became available, just as the revived Chapel Royal relied at first on old anthems."⁴² As discussed in 2-5b1, the principle instrumental pitch at court had probably been Q-1 (448), and this level was presumably revived at first.

But there are indications of a shift in musical styles and instruments during Charles' reign. Gradually, the traditional ensembles (and their pitch) seem to have faded away. By 1679, the traditional "Wind musick" was down to five members⁴³ (probably through attrition), and the group apparently ceased to exist when Charles died in 1685.⁴⁴

The cause of this change was the arrival of newfangled instruments from France. Roger North (1728) gives the impression that the

French influence ("Babtist's [Lully's] vein") was quite marked in England:

But during the first years of Charles 2d all musick affected by the beau-mond run into the French way . . . and all the compositions of the towne were strained to imitate Babtist's vein.⁴⁵

After the manner of France, [Charles II] set up a band of 24 violins to play at his dinners, which disbanded all the old English musick at once.⁴⁶

The new French instruments were at first novelties, but they soon began to take root. Talbot in the 1690s gave a clue as to when this happened: "Chief use of Sackbutt here in England is in consort with our Waits or English Hautbois. It was left off towards the latter end of K.Ch. 2d & gave place to the Fr. Basson."⁴⁷ The second half of Charles' reign would have begun in 1673, precisely the year the first French woodwind players, together with a number of French dancers, arrived in England in the company of the composer Robert Cambert, an erstwhile rival of Lully's.

Cambert had probably used the new French hautboy (at the time no more than seven years old, and possibly brand new) in the operas he had performed in Paris in 1671. It is now thought that Louis XIV himself may have been behind Cambert's move to England, and that Cambert was meant to observe the English monarch at close quarters through his role as the *Maître de musique* to Charles' mistress, a Breton noblewoman named Louise de Kéroualle. Cambert was in charge of a group of French musicians, including three of Louis' singers (who may have had secondary jobs as spies) and "five or six men who play very well on flutes."⁴⁸

Lully's music did not circulate in England until the 1680s,⁴⁹ and the first performance of a Lully opera did not take place until 1686.⁵⁰ But King Charles had a taste for French music, and already in the 1670s Cambert and his musicians were entertaining him and members of his court with snippets of Lully's latest productions that had been on the Paris stage less than a year.⁵¹ In the process, they also introduced London to the latest, most up-to-date woodwinds being used at the Paris Opéra, together with their pitch level.

Four of the "flutists" in Cambert's band took part as "French Ho-boys" in several other stage productions and were hired by one of the two London theaters, the King's Company, in 1674-75. Although at the time there were strong anti-French feelings, the English public evidently liked the new instruments.⁵² From then on, there are regular references to public performances on French woodwinds.⁵³ And if the woodwinds were at French pitch, the rest of the band (which could more easily change pitch) would have had to tune to them.

Influences from abroad apparently made little impression on the pitch system of organs, however. Several authors have pointed to the connection with France through the Dallams, who had lived in Brittany during the Interregnum.⁵⁴ But the pitch of Dallam organs that survive now in Brittany has nothing to do with the *Quire-pitch* system, conforming instead to the usual organ standard in France, A-2.⁵⁵

3-2a1 Consort-pitch (Q-3), Alias Ton de la chambre du Roy (A-1½)

Although the viol consort that had been important earlier in the century seems to have gone out of fashion by this period, *Consort-pitch* continued to be the name for Q-3 (see 2-5b2). In function if not exact frequency, it appears to have been the English analog to *Cammerton* in Germany, a secular pitch associated with "chamber music" (i.e., instrumental music in general). The term "Concert pitch" was also used, evidently as a variant of *Consort-pitch* and identical to it; it is unlikely that two distinct standards would have had such similar names.⁵⁶

Roger North used the name *Consort-pitch* in connection with tuning a harpsichord in his *Theory of sounds* (ca.1710-26; 1959:208): "The first thing is to tune that F to its consort pitch."⁵⁷ In his *Treatise of Musick* (1721), Alexander Malcolm described *Consort Pitch* as "neither too high nor too low, for the Accompaniment of other Instruments, and especially for the human Voice."⁵⁸ Prelleur, in his instructions for tuning the harpsichord (1730:48), recommended "First set your Instrument to Consort Pitch by a Pitch-Pipe or Consort-flute." "Consort-flutes" were thus at *Consort-pitch*. "Flute" was the normal name for a recorder, an effective instrument to use as a pitch reference.

The London recorder maker Peter Bressan, who on the death of James Paisible executed an inventory of his possessions (19 August 1721), listed "two voice flutes, one consort flute and two small ones, an old hautboy and an old cane flute."⁵⁹ In this context, "consort flute" is a size of recorder between the voice flute (in d1) and the "small ones." A similar distinction is made in the phrase "Voice Flutes and Consort Flutes" in a record of new instruments bought by the court of George II in 1732.⁶⁰ The well-known recorder maker Thomas Stanesby Jr. (1732:1) described the "Concert Flute" as "the F.Flute,"⁶¹ meaning what is now called the treble or alto recorder, and Tans'ur in 1746 wrote that "Of flutes there are many Sizes, as a Concert Flute; a Third Flute; a Fifth, and a Sixth, and an Octave Flute."⁶² The pitch of these latter flutes were intervals upward, reckoned from the standard "Concert" or "Consort" Flute.

Organs were sometimes made to *Consort-pitch* and at least two documents specifically associate the recorder with the pitch:

- (1) Renatus Harris' contract in 1722 for his last organ for St. Dionis Backchurch specified "Consort flute pitch."⁶³
- (2) The contract for St. George, Hanover Square, London, (1725) originally specified "Concert Flute pitch."⁶⁴
- (3) The organ at St. Mary Redcliffe, Bristol (Harris & Byfield, 1726) described by its makers as at "Consort Pitch."⁶⁵
- (4) The organ at Vicar's Hall, Wells was lowered by Swarbrick in 1719 "a lesser third to bring it nearer to Concert pitch."⁶⁶
- (5) The restoration by Parker in 1766 of the organ at University Church, Cambridge, involved lowering it to "concert pitch." This was done by shifting the pipes down one semitone (one rank survives with note-names marked).⁶⁷

English recorders should thus give us the frequency of *Consort-pitch*. The pitches of 48 English recorders from this period are known. Thirty-three range from 395 to 405 at an average of 402, and fifteen are pitched from 408 to 418, averaging 411. The majority of these recorders are thus at Q-3, which would logically have been *Consort-pitch*, and the others at A-1. It is not possible to date these instruments exactly; the working dates of the major makers (Bressan, Bradbury, and Stanesby

Sr.) all span a period from about 1690 to 1730. Graph 15 shows only one woodwind (a traverso by Urquhart) above 410 until the period 1700-1730.⁶⁸ But there is no way to be certain of the chronology here. Stanesby Jr., who did not begin work until after 1713, is represented by instruments at A-1, whereas his father, who worked until 1733/34, is not (see Graph 31). Thus, although it is probable that higher-pitched instruments appeared later, it cannot be absolutely determined.

Q-3 was apparently still standard in 1712 (see Rousselet's letter quoted in 4-5a2), and Stanesby Jr. is survived by two traversos at Q-3 (these would have been made after 1713).⁶⁹ Evidently Q-3 continued to be used well into the 18th century.⁷⁰ And between 1670 and 1700, it was apparently the predominant instrumental standard.

That English woodwinds should have been made in some kind of pitch relation to English organs and the *Quire-pitch* grid is not surprising. But (apparently fortuitously) Q-3 happened to have been equivalent to French *Ton de la chambre du Roy* (see 3-1b). This coincidence must have been of great practical benefit.

Bressan had probably begun making instruments when he was still in France;⁷¹ when he arrived in England in 1688, he may simply have continued to use his models of recorders at *Ton de la chambre du Roy*. Since many of the influential players of woodwinds in England at this time were French, *Consort-pitch* at A-1½/Q-3 was probably reinforced by their presence.

Consort pitch was probably used in places where instrumental pitch was decisive, such as in operas and semi-operas, incidental music to plays, and chamber music. A single organ survives from this period that retains almost all of its original pipework and mechanism. Built in ca.1693, it is at Adlington Hall in Cheshire. "This instrument became unplayable before 1800, and survived without alteration until its restoration in 1959."⁷² As would be expected of an organ used in a private house, probably with other instruments, it is pitched at A-1½ (406).⁷³

Using a pitch lower than A-1 affects vocal parts. As Bruce Wood observes, reviewing a recording of Purcell made (interestingly) at A-2:

[The parts now done by countertenors] were actually conceived for two distinct types of voice, which in some early sources are distinguished by the use of different clefs: the alto, for parts requiring a light

but full-voiced tenor, and the mezzo-soprano, for parts demanding falsetto production (a technique which seems not to have been common in England before the late 1680s). Acceptance of this dichotomy causes the lower type of countertenor line, when performed at an appropriate pitch [i.e., lower than 415], to spring into focus: its bottom notes, involving falsettists as they do in awkward changes of gear, lie perfectly for tenors, while in those duet passages in which both types of voice interweave lines often a third apart, the problems of balance, intractable if both singers are falsettists, simply melt away.⁷⁴

Wood suggests that A-2 is "arguably a shade too low" for Purcell. Whether A-2 was ever adopted in England is indeed questionable. English recorders are very specific in pitch, and only one original from this period is below 400.⁷⁵

3-2b Church Organs and the *Quire-pitch* Grid

In this period, the known organ pitches fit consistently into the grid of *Quire-pitch*, Q-1, Q-2, and Q-3 (see Graph 22 and Appendix 7).⁷⁶ Q-1 and Q-2 are the most common.

The old transposing system, where the C-key was used both as a C in "*Organ-pitch*" and F in *Quire-pitch*, went out of use in this period, and organs were altered to function in "Gamut proper" (i.e., the G-key sounded the choir's G) instead of "Gamut in Dsolre."⁷⁷ The keyboard now reflected the notes in *Quire-pitch*. (This was a question of how the keyboard lined up with the pipework, of course, not a change of pitch frequency.)

Bernard Smith (ca.1630-1708), one of the most important English organ makers, described the organ he built at St. Mary-at-Hill, London in 1693 as in the "Toane of the Common Church Pitch."⁷⁸ This interesting name was presumably one of the *Quire-pitch* frequencies. Surviving organs associated with Smith are generally at *Quire-pitch* and Q-1.

3-2b1 Quire-pitch (A=473)

Dominic Gwynn (1985:71) writes of a “ferment in the English organ world” at the Restoration. A number of new organs were built at pre-war pitch but later converted. Many organs newly built after the Restoration were almost immediately rebuilt or replaced.⁷⁹ Most of these organs were either lowered to *Quire-pitch*⁸⁰ from something higher (such as Canterbury Cathedral, built 1663, lowered a semitone in 1684), or new-built at *Quire-pitch* (like Durham Cathedral made by Smith in 1683, and instruments by Loosemore and Robert Dallam).⁸¹

As long as traditional English winds at Q-1 were in use (see 2-5b1), organs would have had to be at the same pitch or a whole-tone higher (Q+1) to accommodate transposition. But to play with the newer French woodwinds that were coming into fashion and were pitched at Q-3,⁸² organs had to be positioned no higher than *Quire-pitch* itself to be within reach by transposition of a m3. An example of this is the organ at Whitehall, built in about 1662.

In Purcell’s day, this was the only permanent organ used by the Chapel Royal. It took part in the “symphony anthems” of the 1670s and 80s, which were performed when the king was present at the Chapel. Symphony anthems, at first, used the older instruments: cornets, sackbuts, and violins.⁸³ Our deductions in 2-5b1 suggest their pitch was probably Q-1.⁸⁴

All this apparently changed in 1678 with the appointment of three French woodwind players to the Chapel.⁸⁵ This event suggests a modernization of the instrumental forces, and a revision in pitch relationships, as the Frenchmen were no doubt using instruments at Q-3. Peter Holman describes two anthems by John Blow from the early 1680s that call for winds, one with recorders and the other for both recorders and tenor hautboys.⁸⁶ If they played in these, of course, the French woodwinds probably played other pieces, doubling the string parts in “symphonies.”⁸⁷

Already at some time before 1676, Smith lowered the Whitehall organ “half a note.”⁸⁸ It is difficult to imagine any other reason for a pitch change on an organ that was only 14 years old than an adjustment to the new pitch orientation of the instruments.⁸⁹ The actual pitches of this organ are unknown because it was burned in 1698, but it is likely Smith lowered it from Q+1 to *Quire-pitch*, in order to put it

within transposing reach of the instruments at Q-3. (Had it already been at *Quire-pitch* or anything lower, Smith would have had no need to lower it.)⁹⁰

Purcell’s music of the 1690s appears to have been written for a lower pitch than previously. Burrows noticed that Purcell took the vocal bass parts to his secular music of the 1680s regularly down to D, whereas in the Odes of the 1690s he never required notes below F.⁹¹ Andrew Parrott cites a confirmation of this drop:

to be found in Purcell’s writing for William Turner, practically the only solo singer named in works from both before and after the introduction of oboes; the later writing lies exactly a tone higher. The shift also offers an explanation for [the singer John] Gostling’s apparent loss of low notes around this time.⁹²

The rise in voice ranges suggests the use of a lower pitch level for these works, which included trumpets and hautboys, and were performed elsewhere than Whitehall. The largest interval involved in these range changes in the voices, a m3, happens to correspond to the distance that would have separated hautboys at Q-3 from organs in *Quire pitch*, such as the organ at Whitehall (if indeed Smith lowered it to *Quire-pitch*). The presence of hautboys, he suggests, may have been the cause of this difference in pitch.

In a sense this is probably true, although as we have seen French woodwinds had been integrated into the Chapel Royal on an *ad hoc* basis more than 10 years before. The vocal parts of the 80s that were notated lower were no doubt at the organ pitch. After Charles II’s death in 1685, “Musick” (that is, concerted symphonies of instruments) was no longer performed at the Chapel,⁹³ and the big works with trumpets of the 90s were performed in different circumstances where transposition was evidently no longer an element (except perhaps for the organist). The parts (both for singers and instruments) were notated differently, but their sounding ranges were not affected.

It is unlikely that Purcell performed his early anthems at Westminster Abbey at a different pitch than at Whitehall. The pitch of the organ at the Abbey is known only from 1730 (when it was at Q-1), but it was presumably at *Quire-pitch* before that. Thus all of Purcell’s music prior to 1690 that involves organ was probably performed by the

singers at *Quire-pitch* (A=473) and (except for the organist) transposed upward by any instrumentalists who accompanied.

Bernard Smith's nephew Gerard Smith, in contracting to make the organ at St. George, Hanover Square in 1725, spoke of a "Church pitch of f [as in] the Organ of St. Paul London."⁹⁴ "Church pitch of f" would probably have meant "the F in *Quire-pitch*," referring to the name of the bottom pipe, which as Tomkins had written in describing the organ at Worcester Cathedral in 1665 was F in "quire pitch" and C in "ye keys & musiks" (see 2-5a). This was not in itself a specification of absolute pitch frequency, although if the pipe was 10-foot, the organ would have been at 473, or *Quire-pitch*.

The organ at St. Paul's Cathedral had been built (or rebuilt) by Bernard Smith in 1696 and its pitch was A=449 (Q-1), his usual lower pitch. In 1665 the pitch of St. Paul's was mentioned by Tomkins as being at about the same as the organ at Worcester,⁹⁵ which was probably *Quire-pitch*, a semitone above the level that Smith gave it in 1696. Smith would probably have lowered it by shifting pipes.

3-2b2 Q-1 (A=448)

Praetorius had said in 1618 that "the English pitch . . . is a very little lower" than his own reference pitch, meaning, presumably somewhere between A+1 (464) and a semitone lower, or 440. As we saw in 2-5b1, Q-1 (centered on 448) was associated with English wind instruments of the older type (cornetts, sackbuts, and shawms). It is perhaps for this reason that organs at Q-1 appear to have been most common before 1700 (see Graph 22a-b). Here are the ones known to me:

Pitch	Date	Present location
450	1623	*Sevenoaks, Knole House
450±	early 17C	*New York, St. David's School
448	1666	Gloucester, Cathedral (Harris)
450±	ca.1680	*Canterbury Cathedral chamber organ
442	1690	London, Hampton-Ct. Palace (Smith)
449±	1696	St. Paul's Cathedral (Smith)
445-52	1698	Cambridge, Univ. Church (Smith)
452±	late 17 th C	*Canons Ashby, chamber organ

446-47	late 17 th C	*Nottingham, Wollaton Hall
443±	1708	Cambridge, Trinity College (Smith)
448±	1730	London, Westminster Abbey ⁹⁶

This pitch seems to have been especially favored for chamber organs (marked here with an *).

3-2b3 "Chappell-pitch:" Q-2 (A=423)

Graph 22 shows the pitches of English organs from 1500 to 1800. The most striking characteristic of this graph is the predominance in all periods of a pitch between 420 and 430. The average of all English organs in a range of 413-436 is 425 (the average for this particular period is 426). Q-2 was the pitch associated with one of the leading English organ makers of the late 17th century, Renuus Harris, who built new instruments and altered older ones to this pitch.

In his Ms notes, made apparently in the early 90s, James Talbot gave lengths and circumferences for three organ pipes at what he called "*Chappell-pitch*": "C2," "C1," and "C." Gwynn (1985:70) calculated that these pipes would yield pitches of 426 to 432, which seems to be Q-2.

3-3 Germany

It is unclear how long Praetorius' pitch terminology was used in Germany. The Dutch woodwind maker Richard Haka made up a bill in 1685 for many instruments and accessories. The bill was directed to a certain Johann Otto and is written in a combination of Dutch and German.⁹⁷ It includes pitch-names that make the most sense if they are seen as similar to Praetorius'. Haka included:

- 6 maple "bas dulsians Coor mes"
- 13 boxwood discant "Schalmeÿen klarin trompettentoon."

These were in the section called "teutsche Schalmeyen." "Coor mes" probably meant "Chormässig" (i.e., suitable for playing with singers⁹⁸), since "bas dulcians" or curtals were often used to accompany choirs. "Klarin trompettentoon" is clearly A+1 and appropriate for instruments called "teutsche" (see 3-3c). If Haka called A+1 "kların trompettentoon," "Coor mes" was evidently another level. The next section was "franse Haubois," and included:

4 boxwood discant Haubois "alle Coortoon."

Since French hautboys were almost always pitched at A-1 or lower, and Haka probably wished to distinguish their pitch from that of the "teutsche Schalmeyen" at A+1, "Coortoon" probably meant they were at A-1, as it usually did for Praetorius. As late as the 1720s, *Chorton* was still sometimes used exceptionally in Germany to mean the lower pitch (see 5-3). In the Habsburg Lands, of course, *Chorton* was the normal term for A-1 until well into the 18th century (see 3-6). But we know that (for unclear reasons), the word *Chorton* was migrating upward from A-1 to A+1, and indeed while Praetorius was writing in the years before 1619 its meaning was becoming ambiguous. We also know of two organs built in the 1680s at A+1 that were described at the time as in *Chorton*.⁹⁹

3-3a The Arrival of French Instruments in Germany

On the tide of the orchestral innovations from France first inspired by Lully, a new pitch orientation arrived in Germany. Along with the new stage works came an orchestra incorporating the latest designs of French woodwinds that had been developed to play with strings. According to Quantz (using 18th-century pitch terminology),

The unpleasant *Chorton* prevailed for several centuries in Germany, as the old organs indicate. Other instruments, such as violins, bass viols, trombones, recorders, shawms, bombards, trumpets, clarinets, etc. were adjusted to it as well. But after the French, with their lower and more agreeable pitch, had changed the German cross-pipe into the traverso, the shawm into the hautboy, and the bombard to the bas-

soon, the high *Chorton* began to be replaced by *Cammerton* in Germany, as some of the newest and most famous organs of the present time testify.¹⁰⁰

At the time of the arrival of French instruments during the 1660s-1690s, Germany was just recovering from the devastation of the Thirty Years War (1618-1648), while France was emerging as a strong power with immense cultural influence. There was a keen interest in French style, both in Catholic courts like Dresden and in the many Protestant principalities where Huguenots could find refuge after the revocation of the Edict of Nantes.

These new instruments were no more flexible in pitch than the existing organs, and being French, they were tuned more than a tone below the usual pitch of German organs. In the south, some woodwinds began to be made by German craftsmen at organ pitch, but they were exceptional; most German woodwinds were made to play a tone below the organs, so they could interface through transposition. As the lower-pitched secular instrumental music gradually prevailed and eventually dominated music making in the 18th century, so did its pitch.

The first French instruments heard in Germany were direct imports that accompanied their players, and were pitched at *Ton d'Opéra* at A-2 and *Ton de la chambre du Roy* at A-1½. German courts began employing French musicians and dancers in the 1660s. In 1664 the reigning Duke at Schwerin, Christian Louis I, married a French duchess, and hired string players who had worked under Lully. At Celle, Duke Georg Wilhelm also married a French duchess and hired a Frenchman, Philippe La Vigne, as his Capellmeister in 1666. By the 1680s, several other courts and cities (including Stuttgart, Hannover, Berlin, Munich, Hamburg, and Darmstadt) had adopted Lully's music and the new instruments to play it. There were performances of Lully's operas at Regensburg in 1683, Wolfenbüttel in the mid-1680s, Ansbach before 1686, and Hamburg and Stuttgart in the 1690s.¹⁰¹

After 1685, Berlin was especially receptive to Huguenots; "by the end of the 17th century every fifth person in Berlin was of French extraction."¹⁰² Two players of the new French hautboy were already engaged at the royal Prussian court in 1681.¹⁰³ Dresden's *Hofcapelle* evidently switched from renaissance to baroque winds in the mid-1690s,

according to court records (cornetts are listed in 1694 but are replaced by hautboys in 1697).¹⁰⁴ It was presumably during the last two decades of the 17th century that instrumental pitch in German courts shifted from A+1 to some form of French pitch. There were pockets that remained at the old high level, however; strings at Weimar, for instance, were still at A+1 in the 1710s (see 6-2).

German makers were soon copying and adapting French wind instruments. Christoph Denner and Johann Schell in Nuremberg were possibly the first. Denner began his career about 1678,¹⁰⁵ just as the new instruments began to appear. It was not until 1696, however, that he and Schell applied for permission from their guild to make and sell the "French musical instruments, that is, *Hautbois* and *Flûtes douces* . . . that were invented about 12 years ago in France."¹⁰⁶ Twelve years before 1696 is 1684; why this date was cited is a mystery, as the hautboy was developed in France in the 1660s (the chronology of the baroque recorder has yet to be established), and French hautboys were being played in Germany before then. It could be that Denner or Schell were in communication with the players at the court in Munich who had been sent to Paris in that same year, 1684, to study woodwind-playing with Hotteterre. In any case, by the year of this official request, 1696, orders were already being made to Nuremberg for "französische Schalmeyen,"¹⁰⁷ and Denner had been commissioned by the town Council to make two "frantzesische Fletten" in 1694.

3-3b The Shift in Terminology

In Praetorius' day, in Germany as in Italy, organs were usually built to play in the same pitch as most other instruments, A+1. Praetorius called this pitch *CammerThon*. But he reported that some organs at A-1 had been raised to A+1 and were still being described as in *ChorThon* (see 2-3a). Like "Chormaß," "*Chorton*" has always been an ambiguous category of pitch, having a meaning associated less with a particular frequency than with a level suitable for playing with singers.

"*CammerThon*" was always a more specific frequency, since it was the pitch associated with instruments that played "chamber music," *Cammer-Musique*. Until recently, the term "chamber music" covered the idea of secular music in general. *CammerThon* would therefore

have been the usual pitch for any instrumental ensemble, large or small, that was not playing in a church or a theater.

The arrival in Germany in the 1680s of the new instruments from France and their low pitch began to affect German pitch terminology. Since *CammerThon* was a name associated with the orchestral instruments first played at courts (that is, "chamber" instruments), when the new instruments started to be adopted their lower pitch took on the name *Cammerton*. There were makers like Denner and Schell who worked in both periods and had made instruments at both pitches, "*CammerThon*" (A+1) and "*Cammerton*" (A-1).

But as we have seen, A-1 had also been a standard in Praetorius' day; it was the pitch Praetorius himself often called *ChorThon*. Thus, the names of pitch standards (*ChorThon*, *CammerThon*) and their frequencies (A-1, A+1) both existed in Germany in Praetorius' time as in Bach's. The difference was that their names were interchanged. Musical practice had reversed itself, so the terminology became inverted. Between the time Praetorius' book appeared and the careers of composers like Telemann and Bach, instrument design and liturgical musical practice had both undergone a fundamental revolution. As is often the case when relationships change, jargon or "buzzwords" within the field were retained, but applied to other concepts. *CammerThon* was still the pitch of instruments, *ChorThon* still that of church music. But the pitch of instruments and choirs had traded positions, so the level of *CammerThon* in the 17th century became that of *Chorton* in the 18th, and vice-versa.¹⁰⁸ Thus, the musical revolution caused by the arrival of French "chamber" instruments did not actually introduce A-1.¹⁰⁹ It merely brought it into the chamber.

A good century after the appearance of Praetorius' book, Adlung (1726:2:55) wrote, "Organs are tuned to *Chorton*, as it is now called, which is 1 or 1½ tones higher than *Cammerton*. Formerly it was the reverse, and *Cammerton* was higher than *Chorton*; organs were tuned to what was then called *Cammerton*." Adlung then referred to Praetorius 1618:14.¹¹⁰

Cornett pitch was the exception to this switch. Praetorius had used the terms "*CammerThon*" and "*Cornettenthon*" as synonyms. So while the names *CammerThon* and *ChorThon* had traded places by the end of the 17th century, *Cornettenthon* and *Cornet-ton* remained the same level, since the cornett stayed at the same pitch. When Georg Falck (1688)

recommended using a pitchpipe tuned to "Cornetthöhe" as a reference for determining the appropriate pitch for a choir to sing, he was implying that composers notated their music assuming the general use of A+1. A document written before 1681 at Corvey (Detmold) prescribed that "The organ should be at *Cornet-ton*, so that its pitch will agree with every [other] musical instrument."¹¹

The situation can be summarized as follows:

	A+1	A-1
Early 17 th century	<i>CammerThon</i> <i>Cornettenthon</i> (<i>Chorthon</i>)	(<i>Chorthon</i>)
Late 17 th and 18 th centuries	<i>Chorton</i> <i>Cornet-ton</i>	<i>Cammerton</i>

3-3c "Deutsche" as an Indication of Pitch

As might be expected, the older instruments in the German renaissance tradition did not vanish overnight. The *Chorist-Fagott* or dulcian long continued its traditional role as a discrete accompaniment to choirs,¹² and the cross-flute, in the form of a military fife, even survived into the 19th century.¹³ The kind of shawm described by Praetorius was probably still in use as late as 1726 (though it had disappeared by 1738).¹⁴

Since the new instruments were French and the old ones were German, the word "German" was sometimes used to identify what we would now call "renaissance" instruments. These "German" instruments were normally at the old high *CammerThon-Cornettenthon* at A+1. But the hereditary words for A+1 were no longer appropriate; *Cammerton* had become associated with a low pitch, and cornetts had become rare enough to convey little about pitch. Another term was therefore needed to identify the older instrument types at A+1, so "deutsche" gradually developed a secondary connotation as an indication of instruments at high pitch. Not that the word referred only to pitch, but the implication was that a "German" instrument was at

A+1, as renaissance instruments normally were. This usage can be seen, for instance, in Majer (1732:32, par.6), who described chalumeaux as: "theils mit dem Französischen, theils mit Teutschem Ton" ("some in French, some in German pitch"). Eisel (1738:104) described the old "Teutschen Basson" (apparently the dulcian) for "Liebhaber des Alterthums" ("lovers of antiquity") as "nicht mehr im Gebrauch" ("no longer in use"). Fuhrmann wrote in 1706, "*Fagotto*, or *Dulciano*, an 8-foot dulcian at *Chorton*. *Bassone*, a French bassoon but at *Cammerton*." "Bach consistently distinguished the "Fagotto" from the "Bassono" by key/pitch (cf. Prinz 1981; also 6-2b), the former being at *Cornet-ton* and the latter a m3 lower. Heinichen actually used both instruments at a distance of a m3 in the cantata *Herr, nun lässest du deiner Diener* (see 5-9a). Among the instruments owned by the Stuttgart court in 1718 were "2 franztösischer [sic] Fagots" as well as "1 Teutscher Fagot,"¹⁶ the instruments presumably distinguished by pitch. The "Dulcian[en]" listed in the 1658 inventory of the St. Wenzel Stadt-kirche in Naumburg are termed "teutsche Fagott" in a later inventory of ca.1720; the "Flöten" of the list made in 1658 are called "teutsche Flöden" in the inventories of ca.1720 and 1728. What had previously been normal had no need of special designations; when it became exceptional in the 1720s, it needed the qualifying label implied by the word "teutsche."

Janowka (1701:42) wrote under "Fagottum": "We can find two kinds: one is German, the other French, determined by their relation with the organ. The first is called *Zinck-thon* [Cornett-pitch]; the second *Chor-thon*." Janowka used "*Chor-thon*" in the older way as a pitch a whole-tone below *Zinck-thon* (see 3-6). He also wrote (1701:43):

"Fletna" (in French, "Flute"). There are moreover four different sizes of flute: some, smaller in size, are called *Quart-Fletten* and sound (as their name implies) a fourth above the Treble flute, and are thus an octave above the size commonly termed Tenor; in present-day music this instrument is seldom usable. The others, however (Trebles, Tenors, and Basses), are commonly used.¹⁷ All are twice as loud.¹⁸ As a matter of fact, they match the German or Bohemian organs, tuned to the *Zinck* or cornett at this pitch. Because they are in the same tonality [as these organs], they are called German, or C-flutes. Flutes with French or Italian fingering, since they are tuned a tone lower, will be

in unison with our fingered B \flat when they play fingered C, and in unison with French and Italian organs. And these French flutes, or "Fletuse" [= "Flûtes douces" or recorders], are said to be in B \flat .

By 1718 an inventory of instruments at the court at Württemberg listed renaissance-type instruments like flutes, curved and mute cornetts, and a dulcian ("alter teütscher Fagot") among those that were "ohnbrauchbahr und nicht zutractiren" ("useless and not playable").¹¹⁹ This list was probably typical in early 18th-century German courts, and is evidence of the change that had taken place.

3-3d Pitches of Surviving Instruments

3-3d1 Organ Pitch

Despite the success of the French instruments at a lower pitch, German church organs, new and old, remained at their traditional high pitch; only a few organs were made lower, beginning in the second decade of the 18th century (see Graph 20c). As in all other periods, the main cluster of organ pitches was at A+1, with a spread of higher pitches (the latter to be discussed next). Of the organs made in this period whose pitch is known, none are lower than the mid-450s. Thus most church music was presumably conceived at A+1. That would have included pieces like Krieger's sacred concertos and cantatas written at Weißenfels in the 1680s and 90s, as well as the works of Erlebach.

Why did organ pitch remain high? For one thing, the Thirty Years War destroyed many German organs and organ-making schools, and left Germany at the beginning of the 18th century with early 17th-century organs.¹²⁰ For another, the organ, as the symbolic religious instrument and the one on which the music director normally played, had a privileged position. Besides that, the organ builder's art was, as Mendel put it, "of ancient lineage, and their traditions tenaciously clung to."¹²¹ Some people preferred the sound of an organ at high pitch; as late as 1756, Mittag wrote:

[Chorton] is the most natural [on an organ]. It makes the organ sound so much fresher and pleasanter than when it is tuned in *Kammerton*. It [Chorton] stands a second higher than *Kammerton* and is especially pleasant in chorale singing and preluding. One does not need to transpose all those chorales whose ranges lie a bit low. With concerted music, especially with oboes and flutes, one can easily transpose down a tone.¹²²

Probably the most important reason older organs were not lowered, though, was the expense involved. To bring the pitch of an organ down meant adding pipes at the bottom end of each register, and these pipes were the largest. Not only were large pipes more expensive, they would not fit into existing (and often highly prized) old organ cases. It was cheaper and simpler to hire an organist who, when necessary, could transpose at sight.¹²³

Schnitger built a transposing 8' Gedackt stop at a lower pitch into the Hamburg Jacobi organ, which was generally at 489¹²⁴ (called by Adlung "Chormäßig"). The stop was a minor third lower (thus at about 407) and was called "*Cammerton*" by both Mattheson and Adlung.¹²⁵ Adlung explained its purpose as follows: "in cases where ensembles involving other instruments [i.e., *Musick*] is performed, re-writing or transposition can be avoided whenever *Cammerton* is used."¹²⁶ The most interesting thing about this stop is its date: it was included when the instrument was built in 1693. This indicates that *Cammerton* was already being used occasionally at the Jacobi in Hamburg (and thus perhaps other German churches) in the 1690s.¹²⁷

3-3d2 Exceptionally High Organs (A+2)

A number of surviving organs were pitched higher than A+1 (see Graph 20b), most of them from this period made by Arp Schnitger (1648-1719).¹²⁸ It is questionable whether they represented any pitch standard. Schnitger made nine surviving organs at approximately A+2, with a range from 489 to 501; among them are a number of well-known and loved examples.¹²⁹ But in fact, he made twice that many organs (19) at an average pitch of 467 (with a range from 460 to 476).¹³⁰

Although Schnitger was well known for his use of older pipes in rebuilding, there must have been other reasons for his use of A+2, since at least half the organs he made from scratch are at that pitch. Harald Vogel (1986:38) offers a plausible explanation: "These organs [made by Schnitger] served mainly to accompany congregational singing, a function based largely on improvisation." Some church consistories actually frowned on *Musick* (works that included other instruments) for liturgical reasons. So where an organ was not used to perform *Musick*, it did not need to be built or maintained at a pitch related to outside standards (and there was a distinct monetary advantage to a higher organ pitch). A case in point is the Jacobi organ's *Cammerton* stop; by providing a special device to allow playing with instruments, the implication is that the rest of the organ was not expected to perform *Musick*.

Most organs in a city like Hamburg were at A+1, but a few were at A+2.¹³ One solution to the problem of matching an A+2 organ to other instruments was a transposing stop, as at the Jacobi church. Another was for the church to have its own set of instruments tuned to its organ. Buxtehude's organs at St. Mary's in Lübeck were at A+2 (a later organist at this church called this "hoch-Chorton"¹³²). Documents from St. Mary's in the 17th century comment that the pitch of its organs was different from the normal performing pitch of the time,¹³³ and the church purchased a number of instruments for use with the organs (three shawms in 1679 and two flutes in 1685 "adjusted to this organ"). Buxtehude several times made a point of noting that their pitch agreed with the organs. The purchase of a "Bombard" in 1685 included an extra expense for a special "Messings Es oder Rohr" (brass crook) "umb selben Orgelmässig zu bringen" ("to make same match the organs").¹³⁴ Buxtehude's soprano and alto parts do not go particularly high, as would be expected with organs at A+2, and are well within the reach of adult male falsettists; his bass parts, by contrast, often extend down to E or D, and, in one case, to C.¹³⁵

German organs at A+2 (i.e., at 480 or above) are not frequent among organs where the original pitch is known; they account for 31 instruments out of 240. They are fairly evenly spread over all historical periods, including Praetorius'. Sixteen are in the extreme north of Germany (Ostfriesland, Schleswig-Holstein, and Mecklenburg), and 13 are somewhat further south (e.g., Thuringia).

Already in 1618, Praetorius (15) had reported with disapproval a pitch level at A+2: "Some people, then, took it upon themselves to raise our current pitch [*CammerThon*] even more, by a semitone."¹³⁶ The obvious reason for this would have been to save money on tin. Ellis (1880:49) quotes the organist at Lübeck Cathedral in 1878, Herr Jimmerthal, as expressing the opinion that "the old organs in Lower or Northern Germany are tuned thus high out of economy to save large metal pipes." The additional lower notes of *Cammerton* organs cost as much in tin as some other entire registers.¹³⁷

Another reason organs could have been at A+2 was due to careless tuning. Repeated tuning, if done carefully, does not affect pitch significantly,¹³⁸ but it is possible to gradually shorten the pipes. For an organ used with other instruments, this would have been disastrous. The situation at the Sophienkirche at Dresden must have been exceptional; a new Silbermann organ was ordered for the church because the old one, while still a "very good and fine sounding organ, was gradually raised in pitch during earlier renovations and tunings, so that for use in figural music it can scarcely be tuned with the instruments . . ."¹³⁹ Organ tuning in churches that regularly used other instruments was thus probably done with much care to avoid raising the organ's pitch.

1312 *Woodwind Pitches*

Of German recorders that were made—or could have been made—in this period, the pitch range is from A-2 to A+2 (see Graph 14b).

A number of French-type recorders made in Germany in these early days (until about 1730) were at A+1, like certain surviving recorders by Hotteterre and Rippert (presumably at *Ton d'Écurie*). These would have been useful when playing with church organs. The German makers of these instruments were Christoph Denner, Herbst, Oberlender Sr., Schuechbauer, and Plaikner, all working in southern Germany (Nuremberg, Munich, and Berchtesgaden). There is also documentation of hautboys in *Cornet-ton*, and several remarkably short hautboys survive; this evidence, too, is associated with southern Germany and Austria.¹⁴⁰ In outward turning details, these instruments appear to be products of the late 17th or beginning of the 18th centuries.

Denner is also survived by two "short" bassoons (as are I.F. Roth and J.W. Kenigsperger—one each) that may have been at A+1.¹⁴¹

The bassoons would probably have been seen as baroque versions of the Chorist-Fagot. And an explanation for the many surviving Denner "G-bass recorders" at A-1 is that in reality they were F-basses pitched a tone higher—at A+1—and made for use in churches to accompany choirs, serving the same function as the Chorist-Fagot. In that case, it would have been convenient to have them at "Chorton" like the organ; the smaller size would have allowed the tone holes to be placed closer together, making them easier to finger (they could have been played by one of the choir members). Their sound would also have carried better. These might then have been called "Chorist-Flöten."

Steffani's *Alarico* was performed in Munich in 1687, and contains the earliest known solo for hautboys, "Care soglie a voi mi porto." It was probably written for the court woodwind players who had been sent to Paris in 1684 to study with Hotteterre. There is reason to think this performance was at A+1. A number of Rippert's recorders at A+1 have ended up in Munich museums and were probably made for the court, and all the surviving recorders of the court woodwind-maker Franz Schuechbauer, who began producing instruments at the end of the 17th century, are at that pitch.

About as many woodwinds at 392-430 survive as those in the high bracket (450-489). This period is thus probably showing the influence of the new low-pitched imports together with new instruments at the traditional *CammerThon* level of earlier generations.

An interesting feature of woodwind pitches in this period is that although A-1 appears to have existed, it is less well-represented than A-1½ (cf. Graph 26b, c, d, and e). Woodwinds at A-1 would of course have been useful in Germany and Holland for playing with organs at A+1. But A-1½ was, after all, probably the most important French instrumental pitch in this period, when French instruments were serving everywhere as models.

3-3d A-2 in Germany

Praetorius had documented the use of a pitch a m3 below *CammerThon* that was "used [he said] a great deal in different Catholic chapels in Germany."¹⁴² This would have been A-2, and may have been derived from the Vatican "*Corista di S Pietro*." It shows that the A-2 level that came in at the end of the 17th century as French *Ton d'Opéra* was not a complete innovation in Germany.

Before 1700, Friedrich Zachow at Halle (a Protestant city) was apparently working with the new French instruments, including the hautboy; hautboy parts were written a minor 3d higher than the others (see 5-9h), indicating that they were pitched at A-2, while the organ and other instruments were at A+1.¹⁴³

In France, *Ton d'Opéra* kept steadily to A-2 until the second half of the 18th century. *Ton de Chapelle* had also been at A-2, but since it was less consistent in frequency (cf. Louis' retuning of his organs), the clearest way of expressing the level at A-2 was to associate it with the *Opéra*. German musicians, having imported the French system, would presumably have made the same distinction. Christoph Denner in 1694 referred to two recorders he had made as both "frantzesische Fletten" and "Opera-Flöten."¹⁴⁴

A-2 is represented in this period by at least two German recorders by Denner and Walch.

3-4 The Dutch Republic

Because of Holland's unique position as an international crossroads open to musical influences from other parts of Europe, and because it was most likely a supplier of woodwind instruments to other places,¹⁴⁵ the pitches of its woodwinds probably acted as a kind weather vane for pitch tendencies in Europe in general. Graph 16 is therefore of particular interest.

On Graph 16b, A-1½ is well-represented, but what is surprising is the clear presence of Dutch woodwinds at A-1 at the end of the 17th century (see also Appendix 5). A recorder by J.J. van Heerde at 416, for instance, is datable to about 1675.¹⁴⁶ The two recorders at A-1 by

Haka could have been made later by his son.¹⁴⁷ But there are five other instruments at 410, apparently made in this period. All of these can be considered too high to fit into the prevailing A-1½ category.

We noted above in 3-3 Haka's use in 1685 of a pitch terminology that may have been standard vocabulary in Holland at the time. If we understand it correctly it was:

Coor mes (<i>Chormässig</i> ?)	A+0 or A+1
klarin trompettentoon	A+1
Coortoon	A-1

Dutch organs in this period were mostly at A+1 (see Graph 24b). The Martinikerk organ at Groningen was described in 1692 as "choormatisch," and in 1728 as "netto Chor Thon;" its pitch was 467.¹⁴⁸

Productions of several of Lully's operas took place in Amsterdam and the Hague in the late 1680s, probably performed by an itinerant "bande française de musiciens et d'opéristes,"¹⁴⁹ and playing, one imagines, at *Ton d'Opéra*. The term "Opera-Toon" was used in a Dutch newspaper announcement of an English harpsichord for sale in 1690,¹⁵⁰ but there is no way of knowing whether this was *Ton d'Opéra* at A-2 or the level called "opra of fluyte toon" in 1701, which was A-1 (see 4-3a).

3-5 The Spanish Netherlands

As we saw in 2-4, "corista" (or, as Couchet called it, "den rechten toon") was the lowest normal pitch level used by the Antwerp clavecimbel makers in the mid-17th century, and it was probably either A-1½ or A-2. No woodwind pitches are known from before 1700. The only known organ pitch from this period (in Leuven, the Begijnhofkerk, 1692) is A-403.¹⁵¹

Brussels was very active as a center of productions of Lully's works from 1682 until the 1740s; as Schmidt wrote "Clearly one of the strongest bastions of Lully performance outside France existed in Brussels."¹⁵² Most of his operas were performed there, as well as a number in Ghent in the 1690s. These were supported by Maximilian II Emanuel, Elector of Bavaria, who was governor of the Spanish

Netherlands from 1691 and lived in Brussels from 1692. A number of French musicians were probably involved in these productions, no doubt performing at *Ton d'Opéra*.

3-6 The Habsburg Lands

The concept of *ChorThon* as a lower pitch continued to be used by Janowka (Prague, 1701), who distinguished *Zinck-thon* and *Chor-thon*. As noted in 3-3c, the term *Chor-thon* was associated with French and Italian wind instruments. Janowka confirmed the M2 relation in another passage:

Organs can be found that are tuned higher and lower; organs everywhere in Germany and Bohemia are tuned to the pitch commonly called *Zinck-* 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 cornetts,¹⁵³ and all instruments that are in unison with the Bb of our organ when they play C.¹⁵⁴

He further cited an important organ that used a transposing keyboard (or *Kammerkoppel*), thus implying that the interval relation was an exact whole-tone: "There is a remarkable organ at the Cathedral of Prague that can play equally well in either *Chor-* or *Zinck-thon*. This is done by sliding the keyboard a certain amount to the left, and is possible on both the manual and the pedal. This lowers the instrument the amount needed to produce *Chor-thon*."¹⁵⁵

The pitch concepts explained by Janowka were apparently generally understood in the Habsburg Lands. A Vesper-psalm, a *Dixit Dominus*, and a *Canticum Magnificat* by the Passau court Kapellmeister B.A. Aufschneider (successor to Georg Muffat), now preserved at Dresden, include "2. Hautb: in Tono Gallico"¹⁵⁶ (two hautboys in French pitch). Another inventory at Kromeríž, compiled during the reign of Prince-Bishop Liechtenstein in about 1695, included two "Hautbois ex B" and two "Flautae ex B" (i.e., French "Bb" hautboys and flutes).¹⁵⁷ The große Orgel at the Stiftskirche in Schlägl was built

in 1634 at ± 404 (A-1½).¹⁵⁸ It was rebuilt by J.C. Egedacher in 1708 "sowohl Chor als Cornett Ton"¹⁵⁹ ([to play] in both *ChorThon* and *Cornet-ton*).

Georg Muffat, writing in Passau in 1698 for the Habsburg Emperors, had also put French instruments a M2 below *Cornet-ton*:

The pitch to which the French usually tune their instruments is a whole-tone lower than our German one (called *Cornet-ton*), and in operas, even one and a half tones lower. They find the German pitch too high, too screechy, and too forced. If it were up to me to choose a pitch, and there were no other considerations, I would choose the former [of the French pitches], called in Germany old *Chorton*,¹⁶⁰ using somewhat thicker strings. This pitch lacks nothing in liveliness along with its sweetness.¹⁶¹

Another anonymous source from this region written in 1718, describing the 1st Psalm tone, instructs: "If the organ is in *Cornet-ton*, the prelude should be in d-minor. But if it is in *ChorThon*, it can be transposed a tone higher to e-minor."¹⁶² "Chor-Ton" here was a whole-step below "Cornet-Thon," as it was for Janowka and Muffat.

There are signs of the adoption of French woodwinds toward the end of the 17th century in other regions of the Empire. Kremsmünster Abbey ordered "ein ganzes Spill Hubua" ("a complete set of French hautboys") from Jacob Fux, and three "französische Schalmeyen" from Stephan Melßhamber of Nuremberg in 1696.¹⁶³ A number of documents from Kremsmünster noting deliveries in the period 1697-1710 make the same pitch distinction as had Janowka:

- One *Fagott* in French pitch.
- 12 *Hautbois* reeds from Vienna, 6 in *Cornet-ton* and 6 in French pitch, 2 fl.
- Two new recorders from common wood [box ?] in French pitch were also purchased at 3 fl.
- Received from Vienna, 24 hautboy reeds and 12 "Fagot" reeds, in *Cornet-ton* and French pitch, 6 fl.¹⁶⁴

On 16 July 1708, the Abbey took delivery of "2 buxbaumene Hoboa, Cornetton 6 fl" ("two boxwood *Hautbois* in *Cornet-ton*, 6 fl"). Paul

Hailperin* believes an hautboy by the Viennese maker Deper (early 18th century?) that survives at Melk Abbey is pitched no lower than A-460.

Janowka leaves little doubt about absolute frequency with his phrase "organs everywhere in Germany and Bohemia are tuned to the pitch commonly called *Zinck-* or *cornett pitch*." Two well-playing cornetts survive from Schloß Ambras that were made some time before 1596 at Venice;¹⁶⁵ their pitch is 464 (A+1). The same level is found on a number of surviving Austrian organs from before 1670:

Baumgartenberg (1662): 460

Innsbruck, Hofkirche (Franziskanerkirche; 1561): 460

Wilten bei Innsbruck, Stiftskirche (ca.1650): 464

Klosterneuburg (1642): 471

The level of woodwinds "ex B" is also a straightforward whole-tone lower, A-1. But if this is associated with Italy and France, things seem a bit too straightforward. Italian woodwinds might well have been at A-1 in 1701 when Janowka published his book, but (as we saw in 3-1b) in this period woodwinds made in France were very rarely at A-1, being more commonly at A-1½ (see Graph 13b). A whole-step higher would have put the organs at A+½, about A-453. Interestingly, there are reports of organs in the Habsburg Lands at about this pitch (see Graph 25). Of course, "French" woodwinds did not necessarily come from France; in at least some cases, the new design of woodwinds played in the Habsburg Lands were obtained from makers in the south of Germany, where, from early on, French-style instruments ("Französische Musikalischen Instrumenta") were indeed being made at A-1 (see 3-3a).

In Salzburg, Heinrich von Biber's *Missa Salisburgensis* (performed in 1682?) included "*Hautbois*," the French name indicating they were hautboys rather than shawms. The parts were in G2 clef in C major, the same key as everyone else, including the trumpets; this indicates hautboys in A+1. Egedacher's organ for Salzburg Cathedral (1705, a year after Biber's death) was at A+1, a pitch similar to other Salzburg organs (Kajetanerkirche, Peterskirche).¹⁶⁶ Biber's connections with Munich suggest the possible use of instruments by Schuechbauer or the Nuremberg makers of the time (Christoph Denner, Schell, and

Gahn). All these makers are known for their high-pitched instruments at A+1.¹⁶⁷ Johann Joseph Fux, already engaged by the court in Vienna, published a "Nürnberger Partita" in 1701 for hautboy, "Flauto" (recorder), and continuo; the trio's title may refer to Christoph Denner or one of his fellow Nurembergers as the maker of the woodwind instruments for which it was written.

Reine Dahlqvist* points out that the Salzburg Cathedral archives contain many chamber pieces with woodwind parts notated a tone higher than the other parts. An example is a *Sonata à 5* by Carl Heinrich Biber for 2 *Obue bahse ex C. 2 Violini. Organo con Violoncello. Violone e Fagotto* discussed by Hubmann (1994:378). All the parts to this piece are in G except the "Obue bahse," (which, as the title says, are in C). As Hubmann explains, these are probably hautbois d'amour at A-1, sounding in A-major; had the other parts been for instruments at A-1, they too would have been notated in A. The fact that they are in G indicates that they were for instruments at A+1, a whole-step higher, while the hautbois d'amour were at A-1. This piece is dated 1736, and suggests that strings normally played at A+1 at this time at Salzburg even in chamber works (the "Fagotto" would presumably have been a dulcian at A+1).

Notes

1. Cf. Haynes 2001, Chapter 3.
2. Rippert had been working "a long time" by 1696. About the end of his career we only know that it was between 1716 and 1723. If he worked for 40 or 45 years, he could not have started before about 1675. An educated guess would put his career between about 1680-1720. Byrne (1983:5) estimates he was born ca.1665. The only date we have for Dupuis is 1692.
3. Paris E.980.2.99. This is the (corrected) average of the eight notes that function.
4. Sauveur 1701:303. Underlining mine.
5. Fontenelle 1700:129. Underlining mine.
6. By Martin Sonnet. See Schneider 1995:713.
7. According to Le Cerf (1705/06:III:178), 20 years before his book was written.

8. *Mercure Galant*, 1695. This idea is suggested by Thomas van Essen*.
9. Van Essen lists H.536 with H.432 (H.537).
10. Sauveur 1701:347. The same three pitches are named in the *Mémoire* of 1713:345.
11. Brossard 1703:202 s.v. "Tuono."
12. Loulié 1696:77.
13. Nivers 1683:108. A large and important body of music was written for nunneries by composers like Charpentier, Nivers, Daniélis, Brossard, Lully, Couperin, and Campra. See Schneider 1995:713. Niver's comment is potentially important, as it suggests that music written primarily for female voices would tend to be performed at a higher pitch than music for male voices. The female voice became important in the second half of the 16th century (Jander 1980:341) and may have influenced pitch choices.
14. And of course the instruments at A+1.
15. For each separate period, the averages are almost identical to this.
16. There are reports of organs at A-1 in this period (Auch, Cathedral; Toulouse, St. Pierre des Chartreux; Rouen, St. Vivien; Gap, Cathedral), but none of them are reliable.
17. E.230. The pitch measurements were made by the author on two different occasions in 1984 and 1993.
18. Dostrovsky 1975:201; Barbieri 1980:19n6.
19. See Rasch 26. Ellis 1880:36 gave 408. See 1-7 for more background on Sauveur.
20. Pierre-François Deslandes (1667-1710).
21. Cf. Mendel 1955/1968:211.
22. The pitch that was general for traditional wind instruments up until the 1914 War, generally known as "le la ancien," was about 404 Hz, = A-1½ (Claude Girard*). Cf. the recording *France: cornemuses du centre*. Unesco Collection (Audvis), 1989, D 8202 (played by Jean Blanchard and Eric Montbel). Montbel's *chabrette* attributed to Louis Maury (1842-ca.1910) is described as "en la 415" but is pitched on the recording at 406.
23. Fleurot 1984:102. Cf. also Benoit 1971:46-47, 61.
24. Benoit 1971:221-22.
25. Hardouin 1963: "Faut-il y voir une influence de Delalande cumulant les charges de la chambre et de la chapelle, ou des organistes du roi? En tous cas les églises suivirent."
26. Dufourcq 1971:I:532. François-Michel Le Tellier, marquis de Louvois, was Louis' most influential minister in the period 1677-1691.
27. Hardouin 1963.
28. Hardouin thought either 1762 or 1787, but Cugnier in 1780 already talks about the pitch as very low (see 8-2a), so we may assume the earlier date is right.
29. The history of the pitch of this organ is actually even more complicated, as explained in Dufourcq 1934 and summarized in Haynes 1995, Section 4-5.

This organ was totally remade recently, but the surviving original materials gave no pitch clues (Gustav Leonhardt*).

30. Chausson and Koenig 2001.

31. Burney 1771:30.

32. This is reproduced in Beaussant 1992:461 (I am grateful to Geoffrey Burgess for pointing this out to me).

33. Benoit 1971:73. Benoit notes that "certains [artistes] appartiennent aux deux troupes."

34. Including François Buchot, René Pignon Descoteaux, Michel Herbinot dit Destouches, six members of the Hotteterre family (Jean I, Martin, Colin, Nicolas, Jean II, and Louis), "de La Croix," Philippe Philbert, André and Jacques Philidor, three Pièches (Joseph, Pierre, and Pierre-Alexandre), François Arthus dit Plumet, and Jean Rousselet. Cf. LaGorce 1989:104ff.

35. See LaGorce 1989:103.

36. Bouissou (1992:43) describes the mixture of musicians living at Versailles and Paris for the rehearsals in 1763 of Rameau's *Les Boréades*.

37. Although several of Rippert's A+1 recorders were made for Munich and might have been special orders, others also exist at the same pitch (Paris E.2136, Paris C.1387/E.1515, Basel HM 1956.633).

38. Cf. Semmens 1980:131. All the English recorder tutors starting with Hudgebut (1679) treat exclusively the recorder in *fi*. As Eppelsheim (1961:71) reasons, since these books were dealing with a "French" instrument, the custom was probably also common in France.

39. See Haynes 2001:95.

40. Holman 1993:275.

41. For a detailed survey of the personnel of the royal Wind Musick and their instruments, see David Lasocki's forthcoming *Woodwind instruments in Britain, 1660-1740*.

42. Holman 1993:275.

43. Lasocki 1983:115.

44. Halfpenny 1951:109ff draws attention to the depictions of three members of the King's Music playing cornett and flat trumpets for the coronation of James II in 1687.

45. From *The Musicall Gramarian*, 1728.

46. North 1959:300. North's statements exaggerate. There had in fact been a strong French presence at court before the war, and the posts of a number of French musicians were taken over at the Restoration by Englishmen (Holman 1993:283, 289); indeed, every member of the famous "24 violins" was English. Further, although Charles had stayed in France during the Interregnum (he was actually present at the French court for a total of less than two years), at the time he returned to England in 1660, Lully had only just begun to influence developments in French music (see below).

47. Baines 1948:19.

48. "Cinq ou six hommes qui jouent fort bien de la fluste." Buttrey 1995:205.

49. Holman 1993:313.

50. Schmidt 1989:208.

51. Buttrey 1995:209.

52. For background, cf. Ashley 1971 (especially page 234) and Chapter XVII of Lasocki 1983.

53. Cf. Lasocki 1983:330ff.

54. Hopkins & Rimbault 1855:190, Owen 1986.

55. Lanvellec (1647) is at 388 and Ergué-Gabéric (1680) at 389.

56. The first reference to "Concert pitch" is 1719.

57. Cf. a more complete quote in 1-38.

58. Quoted in Strahle 1995:88.

59. Lasocki 1992:61.

60. Daub 1985:274 citing the Lord Chamberlain's papers (Public Record Office), 5/18-5/21, *passim*.

61. Quoted in Higbee 1962:57.

62. Quoted in Griscom and Lasocki 1994:216-7.

63. Segerman 1992b:54.

64. Gerard Smith, the maker, later crossed this out and replaced it with "Church pitch of *f* [as in] the Organ of St. Paul London." See Platt 1993:36.

65. This organ was replaced in 1866. See Carrington 1992:117, 121.

66. Gwynn 1985:69,76.

67. Thistlethwaite 1978.

68. A traverso by Urquhart (Edinburgh 1908.252) is at 418; this maker's dates are uncertain (late 17th century or early 18th).

69. Modena: Museo Civico and Horniman 241.

70. A traverso by Cahusac, London, ca.1780 (Frankfurt: Spohr 149) has a long-cornet corps at 402 (the other two are 428 and 433).

71. Waterhouse (1993:44) suggests that certain features of his instruments indicate a Parisian background. Having come from Bourg-en-Bresse, he probably had some connection with the woodwind maker Perrin, mentioned by Borjon in 1672.

72. Bicknell 1996:144.

73. John Pike Mander*. Mander notes that the date is only an assumption.

74. Wood 1990:496.

75. In 1713 the English physicist Brook Taylor measured the pitch of his harpsichord at 383 and 390 or slightly higher (see 1-7). But it is not known if Taylor's harpsichord was tuned to a reference pitch.

76. There is one organ a semitone above *Quire-pitch* (Q+1; B. Smith, 1673): presently Walton on Thames, earlier in the private chapel, Windsor.

77. Bicknell 1996:119.

78. Freeman & Rowntree 1977:33.

79. Cf. also Bicknell 1996:117.

80. Cf. Gwynn 1985, Table 2.

81. Cf. Goetze 1994:61.

82. It is possible that the front C pipe of the organ at St. Botolph Aldgate in London (B. Smith, ca.1674) that has "aux ton de Fransz" written on it has

something to do with an organ adjustment to the new French wind instruments. The date is right. John Pike Mander* writes that "there is now no means of telling what the exact original pitch was."

83. Holman 1993:394.

84. Peter Holman noticed in 1993:397 the purchase in 1664 of some special string instruments for use in the chapel, and also noted that "The members of the Twenty-four Violins who played in the chapel seem to have used special instruments there." ("Purcell and pitch;" Correspondence, *Early Music*, May 1996:366). He suspected a connection to the organ's pitch, and I suggest the organ was at Q+1 and the violins at Q-1, for reasons that will be clear further on.

85. Lafontaine 1909:322, Ashbee 1986:1:179.

86. Holman 1993:408.

87. Cf. Haynes 2001:168-70.

88. Freeman and Rowntree 1977:13.

89. It is true the French woodwind players were not officially appointed until 1678, but they may already have been playing earlier, as they had arrived in England in 1673.

90. Burrows suggested that the pitch of this organ (of which Purcell was the organist) could have been the reason that wind instruments are almost never specifically required in his anthems. But there was no technical reason wind instruments (and strings as well, for that matter) could not have played the Chapel Royal repertoire with this organ at an interval of a m3 between *Quire-pitch* and Q-3 (Bach used this interval at Weimar—see 6-2b).

91. Burrows 1981:135ff.

92. Parrott 1995:416.

93. Holman 1993:411. This became official in 1689 when the new King William III ordered "That there shall be no musick in the Chappell, but the Organ."

94. Platt 1993:36.

95. Mendel 1978:64.

96. Made by Schreider and Jordan.

97. See Bouterse 2000:243-50.

98. See 2-1.

99. Corvey (Höxter), 1681, at 462 (Chorton) and Norden (Ostfriesland), St. Ludgeri, 1688, at 474 (Chor-thon). See Appendix 1.

100. Quantz 1752:Ch XVII/vii/§6.

101. Schmidt 1989:208.

102. *Encyclopedia Britannica*, 15th ed., 20:49. As a result, "the Berlin dialect still employs many terms of French derivation."

103. Schneider 1852:48, 52; Sachs 1910:61,172.

104. Landmann 1989:21. Friedrich August I became Elector in 1694 and in 1698, the Saxon court Capelle was reorganized, making the switch to French instruments. Volumier (Woulmyer) did not arrive in Dresden until 1709 (Landmann 1982:49), but the hautboist François La Riche was there by at least 1700 and perhaps earlier.

105. Nickel 1971:206.

106. Nickel 1971:206.

107. These may have been baroque Schalmeyns (see Haynes 2000).

108. No trace of 16th- or 17th-century German organs tuned at A-1 appears to survive.

109. Even A-2, which became known as "*tief-Cammerton*," already existed in Germany in Praetorius' time. See 3-3d3.

110. This switch of names and meanings was also mentioned by Fritz (1756:12-3) and Sponsel (1771:80-1).

111. Reuter 1965:324.

112. Christoph Weigel's picture of a woodwind maker (1698) shows prominently both a French bassoon and two dulcians.

113. Brown 1980b:6:541.

114. Haynes 2000.

115. Fuhrmann 1706:92. Quoted in Prinz 1981:110. Cf. Walther 1732:219 s.v. "Dulcino." Adlung (1726:1:92) cites Fuhrmann.

116. Owens 1995:206.

117. These are the common renaissance sizes (cf. Praetorius).

118. This phrase is difficult to understand; Herbert W. Myers (*) suggests that these may have been recorders of renaissance design, which sounded louder than baroque recorders not only because of their pitch but because of their fatter bore and more open voicing.

119. Owens 1995:399.

120. Flade 1953.

121. Mendel 1978:91.

122. Mittag 1756:7, cited in Jackisch 1966.

123. A practice generally expected of a competent organist (see 5-2c). See also 7-1a on *Kammerregister* and *Kammerkoppel*.

124. Ellis 1880:49.

125. Mattheson 1721:176. Adlung 1758:386; 1726:1:100, 193. It was replaced by an 8-foot Gamba at 489 in 1761.

126. Adlung 1726:1:100.

127. On this stop, see also 7-5c.

128. For a list of the pitches of Schnitger's extant organs, see Haynes 1995:198-99.

129. Cf. Vogel 1986:38.

130. The group at A+1 dates from 1680-1710; that at A+2 from 1687-1721 (with the exception of Stade, 1673).

131. The well-known organ at Cappel bei Bremerhaven (Schnitger extensive rebuild, 1680) is at 461. It was originally built for the Johanneskirche in Hamburg and is one of his best-preserved organs. The Schnitger now at Grasberg bei Bremen (1694) was originally built for Hamburg's Waisenhaus. It is at 468. The Pankratiuskirche organ at Neuenfelde (near Hamburg) by Schnitger, 1688, is at 490.

132. Snyder 1987:468, citing J. von Königslow, writing some time between 1773 and 1833. The pitch of the large organ in this church was measured by Hopkins and Rimbault (1855:189) at 487. It had been replaced in 1851. Three other organs at Lübeck at St. Jacobi (small organ), St. Jacobi (large organ), and the Cathedral were also at A+2.
133. Snyder 1987:85.
134. Snyder 1987:476. The St. Annen-Museum in Lübeck possesses three cornetts, one at A+1 and two at A+2.
135. Snyder 1987:367.
136. Tr. from Crookes 1986.
137. Sumner 1952:289.
138. Dominic Gwynn*.
139. Wolf 1738:63 (orig. p.160); quoted also in Flade 1953:107.
140. See 5-4b. Christoph Denner and Oberlender did not make exclusively short instruments; they are both survived by a number of long hautboys.
141. White 1993:121n93.
142. Praetorius 1618:16.
143. See further 5-9h.
144. Nickel 1971:199.
145. See Haynes 2001:63.
146. Edinburgh University, 257.
147. Haka died in 1705; in an advertisement in 1700, he stated that he would continue making instruments with his son (Bouterse 2001:95).
148. Fock 1974:273,215-26; Vente 1958:187ff; Edskes 1968:37; Jürgen Ahrend*; Dorgelo 1985:67,71.
149. Schmidt 1989:199ff.
150. Gierveld 1977:414.
151. *Organ Yearbook*, 1988, 19:43.
152. Schmidt 1989:202.
153. The translation of "clarini humiliati" is not certain, but "humiliati" means soft, and the mute cornett would probably make sense in this context, being normally a tone lower than "Zinck-thon." (One wonders if the term "clarino" could refer to cornett rather than trumpet in other contexts.)
154. Janowka 1701:93. See also 315.
155. Janowka 1701:94.
156. Koch 1980:55, Horn 1987:130.
157. Otto 1977:xv-xvi.
158. This pitch is an estimate, being about a M2 below the "Cornett Ton" in 1708, which was 451.
159. Freiburger (n.d.):34.
160. In the German, "den sogenannten Chor-Thon." Mendel 1978:15n10 confuses Muffat's "ton du Cornet" and his "ancien ton du choeur," mistakenly suggesting that Muffat did as well.
161. Muffat 1698. Also quoted on p. xxxviii.
162. Transcribed in Walter 1971a:170.

163. Kellner 1956:291.
164. These citations are from 1697 KRB 350, 1710 KRB 270, 1708 KRB 324, and 1709 KRB 256, cited in Kellner 1956:285, 299, 303, and 304.
165. Now at the KHM in Vienna. See Haynes 1995, Appendix 2-2a.
166. A report on the great Cathedral organ in 1841, just before it was retuned, said it was half a tone higher than "normal pitch," which would then have been A+0 (Reine Dahlqvist*).
167. On Denner and Schell, see Haynes 2001:143.