

BATE COLLECTION HANDBOOKS

A BRIEF INTRODUCTION TO THE

MUSICAL INSTRUMENTS

OF THE BAROQUE

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**THE BATE COLLECTION
OF
MUSICAL INSTRUMENTS**

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A Bate Collection Handbook from 1990

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Our period runs from the first opera, Monteverdi's *L'Orfeo*, first performed in 1607, with its orchestra (using the word in its basic meaning of a body of instruments), which was then still a number of separate chamber groups, to the death of Johann Sebastian Bach in 1750.

While for all instruments the Baroque was a period of revolution, with new instruments appearing and the old instruments of the Renaissance changing to such an extent that they were all-but new, this revolution was a slow process, with different instruments changing at different times. In addition to the surviving instruments of the period, our main information comes from three important literary sources, two of them well illustrated. For the instruments of the early Baroque we have Praetorius's *Syntagma Musicum (Vol. II de Organographia)* in Germany in 1619 and Mersenne's *Harmonie Universelle* in France in 1636. Rather later we have James Talbot's manuscript, compiled in England between 1680 and 1690 (Christ Church, Oxford, *music ms. 1187*). All three of these sources are available in print. The whole of the Talbot manuscript has been transcribed in various volumes of *The Galpin Society Journal*, starting with the wind instruments in Vol. I; the other instruments can be found in the indexes of that Journal. Praetorius and Mersenne are both available in facsimile, and have also both been translated into English. Praetorius has been translated fairly well, if somewhat eccentrically, by David Crookes, and less accurately by Harold Blumenfeld; Mersenne has been translated rather unsatisfactorily by Chapman.

While in Praetorius, at the very beginning of the seventeenth century, we already have some instruments in their Baroque form, in Talbot, written around the birth dates of both Bach and Handel, by which time the Baroque was fully estab-

lished, we still have evidence for the use, in England at least, of some Renaissance instruments.

The string instruments were the first to change, with the viols in Praetorius already recognisably the Baroque model. They were also the first to change in fashion and taste, for by Talbot's time, the viols were already going out of fashion in England. Purcell, in the late seventeenth century, was the last major English composer to write for viols, and he was regarded as old-fashioned for so doing. And yet, when he died, the Baroque woodwind were still 'the latest thing', only just beginning to be accepted in Britain.

Both viols and violins were invented in the early Renaissance, between 1470 and 1500, and both reached their established form which was to persist throughout the Baroque within a century of the earlier of those dates. The main characteristics of the viol in all periods are six strings tuned in fourths, with a third in the middle, with frets on the fingerboard, held on or between the knees (hence the name *viola da gamba* or leg fiddle), with low-arched front and a flat, or flattish, back, and bowed with the bow held underhand. Of the bowed strings it was, *par excellence*, the instrument for chamber music, for playing in groups as a consort of viols of different sizes, from treble to bass, and from the time of its invention, early in the Renaissance, into the early Baroque, it was regarded as the ideal bowed string instrument. When, as we shall see, the consort of viols was replaced by the violin band, the bass viol was the one size which remained important, now usually with seven strings, with a considerable solo repertoire in France, with composers and virtuosi such as Marin Marais, and with some use in Germany and elsewhere as well, as the obligato in Bach's *St. John Passion* reminds us. In Central Europe one special form survived into the Classical period. The baryton, the favourite instrument of Haydn's employer, Count Esterházy, was a bass viol with sympathetic strings that could also be plucked by the left thumb for added accompaniment to the bowed strings.

The violin, which began as a three-stringed instrument, a rebec on a body which derived from the *lira da braccio*, was used mainly for dance music in the early Renaissance, continuing the function of the rebec. It became accepted as an instrument for serious music in the early seventeenth century, as can be heard in *L'Orfeo*, with an important obligato part in Orpheus's great aria. By this time a fourth string had been added and makers such as Andrea Amati in Cremona

and Gasparo da Salò in Brescia had brought it near to its finished form, and by 1600 Andrea Amati's son and pupil, Heironymus, and his grandson Nicolò had so outshone the Brescian makers that the Cremona fiddles cost three times those of Brescia and reigned supreme.

In contrast with the viol, the violin had four strings tuned in fifths, without frets, held upwards on the shoulder or against the upper arm (hence the name *viola da braccio* or arm fiddle), with a high-arched belly and back, and bowed with the bow held overhand. It was, par excellence, a solo instrument, though when the family of violins, again from treble to bass, supplanted the consort of viols, it was perforce used in groups. This change came initially in France, in the second quarter of the seventeenth century, with the *Vingt-Quatre Violons du Roi*, the violin band of Louis XIII. According to Mersenne, this band consisted of six violins, twelve violas in three different sizes, and six basses. All three sizes of viola were tuned the same, but were used, appropriately to their size, in different ranges, from mezzo-soprano through alto to tenor. Whether the basses included the double bass as well as the 'cello, we do not know, but the double bass was certainly known to Praetorius. This string band was brought to England by Charles II at the Restoration, from Paris where he had spent most of his exile, and it then, in all fashionable circles, almost immediately replaced the consort of viols, and it became also the fashionable sound throughout Europe.

Strings on both viols and violins were at this time all of gut, thus limiting to some extent the available sonority of the lower register, for too heavy a gut string produces a comparatively dull sound. One of the benefits of improving technology in the mid-seventeenth century was the invention of the slow feed on the lathe, and it was this that allowed the introduction of gut strings covered with a coil of wire, the first evidence for which comes from Playford in the 1660s. What had been used up to that period was first a high-twist gut, which gives better results than a normal twist, and then catlines, which are thought to have been gut strings which were laid in three strands twisted together, like a rope, and which give better results still in the bass. The difference of tone quality on the violin G string, and on the lowest string on all the other instruments, between the high-twist gut and catlines and the new covered strings was considerable. It is a difference that is only beginning to be appreciated today, now that we are becoming conscious of the

difference, too, between our modern whining steel strings and the plain gut which held sway, even for the E string, until the early years of the twentieth century.

The violin itself was also very different from the modern instrument. The neck was at least a centimetre shorter than it is today, and it was straight, rather than canted back as it is on the modern violin. The bridge was lower, the soundpost, the pillar which supports, internally, the treble foot of the bridge, was more slender, and the bass-bar, the girder which runs up the inside of the body under the bass foot of the bridge, was also more slender and much shorter. As a result the tone quality of the Baroque violin was very different from that of the nineteenth century.

The feel of the instrument was different, too, for because the neck was straight, there was a wooden wedge between the upper surface of the neck and the under surface of the fingerboard. This was necessary because the fingerboard must rise to follow the plane of the strings lest, as the player produces higher notes, there be too great a distance to press the string to the fingerboard. As a result, the distance between the thumb, on the back of the neck, and the finger, on the string, changes as one moves up or down the fingerboard; as Yehudi Menuhin remarked, when we gave him his first experience of a Baroque violin at the Galpin Society Exhibition in Edinburgh in 1968, one can judge one's pitch by thickness as well as by ear, just as one can judge even very slight differences of thickness between two pieces of paper between finger and thumb. Because the accepted upper range of the violin was less than today, the fingerboard was much shorter than on the modern instrument, but as composers wrote higher and higher parts, the fingerboard was lengthened progressively throughout the Baroque period to accommodate this greater range. There was, of course, no chin rest (that was introduced by Spohr in the early nineteenth century), and therefore much of the weight of the violin was taken by the left thumb. This affected the way in which the fingers moved on the fingerboard, and the silent shift of position, which is so firm a feature of modern violin playing, did not exist in earlier times. Shifts were audible, and probably slower than today, and thus the ways in which notes were linked together differed from modern practice. This is something that modern 'Baroque' orchestras are reluctant to recognise; like the full-scale ornamentation which we know was practised in this period from the contemporary editions of

Corelli and Telemann among others, the audible shift is avoided in case it scares away the customer, thus falsifying the concept of 'authentic' performance.

Bowing in the Baroque was vastly different from that of the Beethoven period, for the bow stick, instead of being cambered towards the hair, curved away from it, resulting in much lower tension on a narrower ribbon of hair than the modern bow, and the point of the stick curved down gently towards the hair, rather than being held away from it by an axe-shaped point as today. The tension of the hair was controlled on the early bow simply by the spring of the stick, and the frog just clipped in between the hair and the wood; later the *crémaillère* was used, a bridle that slipped into ratchet-like notches. The screw frog came into use late in the seventeenth or early in the eighteenth century (see David Boyden, *Early Music*, April 1980 and Julian Clark's response in October of that year). As a result of these differences, the sound was less strong than in the nineteenth century and today but there was a much more marked difference of tone between up-bow and down-bow, and between strokes taken at the heel and at the point of the bow, an entirely different sound from the modern ideal of seamless bowing.

There were some other sizes of violin family that have vanished today. The violino piccolo was a half- or quarter-size violin. I know of no way to distinguish between the piccolo and the ordinary small-size children's violin; strung with normal strings at normal tension, the shorter string length means that it sounded a third or so above the normal pitch, as for example in *Brandenburg 1*; strung with thicker strings, or at lower tension, the pitch would be the usual violin pitch, and it would then be a small size instrument for children to learn on. There are some instruments in museums labelled violino piccolo, but this is because people assume that nobody would go to Amati or Stradivari for a child's violin; if you are rich enough, why not? Another was the 'cello piccolo, smaller than a normal 'cello and with a fifth string *above* the normal four, as in the Bach *6th 'cello Suite*. Another was the viola pomposa, a larger size of viola with a fifth string *lower* than the normal four.

The lowest member of the family, the double bass, has always been a problem; Praetorius illustrates a normal four-string instrument. As far as we know, the bass was always tuned in fourths, not fifths, simply to bring a reasonable number of notes under the hand on a long string length. If, as today, the lowest note was E, how did basses play the normal bass parts, which go down to C or B \flat , the

lowest notes on the 'cello? If, as often in the nineteenth century, basses only had three strings, the problem is even greater. The answer is simply that we do not know. Maybe they tuned all the strings down a third so that the lowest was on C; maybe they jumped octaves, as they often do today, so that sometimes they were in unison with the 'cello and sometimes an octave lower. Bach's bass lines are always so linear that this does not seem to me probable. Maybe Bach really meant it when he wrote violone, and they sometimes used the great bass viol and not the double bass, though that is only an occasional solution. There is quite a lot we do not know about the baroque period.

Of the plucked string instruments, lutes, harps, and keyboards were the most important, with the guitar and other plucked strings such as citterns more often confined to domestic and casual music-making.

The Renaissance lute, tuned like the viol with six strings in fourths and a third, was already out of fashion, but larger instruments with extra bass strings, often carried on an extended neck, were still in use, mainly as continuo instruments. This is something that is too often forgotten today; the theorbo is a very satisfactory continuo instrument, especially for smaller groups, and it is far more portable than a harpsichord. In the early period the neck was very long; later, with the introduction of covered strings, it could be shorter, and this type of bass lute remained in use until late in the eighteenth century.

The lute was also still an important solo instrument, especially in Germany, and many composers such as Silvis Weiss wrote works for the ordinary lute with some extra courses on the fingerboard, not least among them Johann Sebastian Bach, whose solo suites exist for lute as well as for violin and violoncello.

The harp was increased in size around 1600, sometimes as a single harp but more often it acquired first one and then a second extra rank of strings, so that the main Baroque form of the harp, after Monteverdi's arpa doppia, was the triple harp, an instrument which has remained in use in Wales to the present day. The two outer ranks of strings were tuned diatonically, with chromatic strings in the middle rank. This was the harp for which Handel, for example, wrote a concerto, but which was mainly used, again, as a continuo instrument. The diatonic harp, with a single rank of strings, was also used, still usually with the brays which add a buzz to the sound and make it richer in overtones, and in a late sixteenth-century encyclopædia, François Merlin and Jacques Cellier's *Recherches de Plusieurs Sin-*

gularités (Paris BN ms.fr. 9152), it is described as preferable to both lute and harpsichord, for unlike the lute every note comes from the full length of the string and thus with full tone, and unlike the harpsichord it can be plucked in an infinite variety of ways, and can thus produce many different tone colours.

One could describe the Baroque as the great period of keyboards. While the organ goes back to Roman times and the harpsichord and clavichord at least to the later Middle Ages, around 1400, and we have an extensive repertoire of music for organ and harpsichord from the Renaissance, nevertheless, it is in the Baroque that they achieved their greatest flowering.

The harpsichord was the most commonly used continuo instrument, because it was more portable than an organ (cheaper, too), unless one were playing in a church or a chapel, and because of its greater facility in playing in chords than the harp or the bass lutes, and it was also, of course, a solo instrument. It produces its sound by plucking the string with a quill mounted in a jack, so-called because it jumps up when the key is depressed.

There were two main varieties of harpsichord in the earliest Baroque, the Italian and the Flemish. The early Italian instruments, which seem also to have been used in Germany, usually had only one keyboard, sometimes with three ranks of strings, two tuned in unison, and a third rank an octave higher, described as $2 \times 8' + 1 \times 4'$, though often with only the unison ranks, $2 \times 8'$. The Italian harpsichords were lightly built, with cases and soundboards of cedar, and often had no lid or stand, but slid into a complete outer case from which they had to be extracted to be played. The Flemish harpsichords were much more heavily built. The early instruments had only one $8'$ rank, plus the $4'$, but later instruments were more usually the same $2 \times 8' + 1 \times 4'$, though usually rather shorter in scale, shorter in string length for the same pitches than the Italian, and this combined with the heavier cases meant that the Flemish sound might be described as fuller and darker and the Italian as brighter and more sparkling.

Most of the harpsichords made by the Ruckers family in Flanders had two keyboards, on the lower of which the notes appeared to be a fifth lower than they sounded; the upper manual C key plucked the same strings as the G key of the lower manual. The purpose of this arrangement, the so-called transposing double manual, is still a matter of dispute. On both manuals, the lowest key looked like an E, but sounded C; this is the bass short octave, where the other 'white' notes

sounded their expected pitches but the F \sharp key was tuned to D, the G \sharp to E, and the B \flat to its normal pitch. This arrangement, which is usually referred to as the C/E short octave, was used to save space well into the eighteenth century, and when the range was increased in the bass, the G/B short octave was similarly arranged.

By the early eighteenth century, two other national schools had arisen, the French and the German, the former deriving from the Flemish and the latter from the Italian, and by the middle of that century a third, the English. By this time, the use of two manuals was the norm, although single-manual harpsichords were always also made, if chiefly for domestic use, but, instead of transposing the music into different keys, the two manuals produced different sonorities so that the player was able to contrast one passage with another, and even one hand with the other. One eight-foot rank was plucked nearer the nut (the bridge on the wrestplank) than the other, thus producing a different tone colour, so that the two unison ranks could contrast with each other, and the four-foot rank could be added to one of these, or could be used instead of it. There was always a way of coupling both keyboards together, so that all three ranks could be sounded together for the fullest tone and volume. Further devices were, in England and in Germany, an extra row of jacks to pluck the strings very close to the nut, called the nazard in Germany from its nasal sound, but called the lute stop in England, and, in France as well as in England and Germany, a row of small pads of buff leather which could be slid against the strings to mute them, called the peau de buffle in France, the buff or harp stop in England but, confusingly, the lute in Germany. German harpsichords also went in for extra ranks of strings, sometimes adding a 16' stop, and occasionally a 2' as well.

It is important to remember that these various national schools of harpsichord-making persisted through the eighteenth century. Bach's music was conceived for the instruments by Hass and Silbermann, Couperin's for those by Taskin and Couchet, and Handel's for those by Shudi and Kirckmann. As a result the music of all three composers sounded quite different, a difference which is too often forgotten and lost today. A fascinating speculation is whether Scarlatti's sonatas were conceived for Cristofori's piano, an instrument which was, as we shall see, as popular initially with the Spanish court as that master's music.

There were also small harpsichords. In the early Baroque the virginals, which survived from the late Renaissance, was still in use. This was an instrument with

a very different tone quality from the harpsichord, with strings running across the instrument instead of away from the player, and with both bridges on the soundboard. Again there were different national types, the Italian and French, called spinetto and épinette respectively, and the Flemish. There were two types of Flemish, the ordinary virginals and the muselaar, the latter (of which we have a copy in the Bate Collection which students may use) plucking the strings near the middle of their length and thus producing a darker and more hollow sound because plucking at that point eliminates the even-numbered harmonics. Both were often equipped with a smaller 4' instrument which lived in a drawer to one side of the main keyboard. This 'child' was put on top of the 'mother' virginals for use, and could be played with, or contrasted against, it. The jacks of the mother pushed up the jacks of the child so that one can either play on the child or on both mother and child together.

In the late seventeenth century a new small instrument, the wing-shaped or leg-of-mutton spinet, was devised in England and France, but this should really be considered a domestic harpsichord, designed to take less space in the room. The sound is as close to that of the full-size harpsichord as that of the baby grand is to the grand piano.

The perfect domestic keyboard instrument, but one which was used more in Germany than elsewhere, was the clavichord. This is the only keyboard instrument whose player is in direct contact with the string as long as the note is sounding, for the finger is on one end of the key, and the tangent on the other end is touching the string. By increasing or decreasing the pressure on the key, one can produce louder or softer sounds, something that was impossible on all the other keyboards of the period, and one can also produce a vibrato on the note by a slight up and down movement of the finger on the key, the *Bebung* of C.P.E. Bach.

Seventeenth-century and early eighteenth-century German and Italian clavichords were fretted, with the tangents sharing two or three strings. This was possible because the tangent acts as a nut, like the finger on the violin fingerboard; the string vibrates only from the tangent to the bridge. Thus, if the next tangent is the right length of string away from the first, it can share the same string, just as the fingers share a string on the violin. This arrangement was an economy in cost (fewer strings were needed), it saved time in tuning (half to two-thirds of the strings were fixed in pitch by the distance of their tangents from their neighbours),

and it increased the volume (there was less strain on the soundboard), so that there were advantages all round. The basic disadvantage was that a number of dominant 7ths were unobtainable because only the key nearest the bridge would sound, so for example, if you played a G7 chord, the F might not sound because the G tangent forestalled it. By Sebastian Bach's time, fretting in pairs was common, and this inhibited only a few suspensions, which a skilful player could 'fake'; it was not often that one wanted C and C♯ together. The wholly fret-free clavichord, with every string having its own tangent, normally comes only from the middle of the eighteenth century, by which time a number of makers, especially the Hass family, had added a row of 4' strings in the bass to brighten the sound.

Because one clavichord could be mounted on top of another, to simulate the manuals of the organ, with the possibility of a pedal clavichord as well, it was the ideal practice instrument for organists. It could be used in the warmth of the home, instead of playing in a cold church, and there was no need to pay someone to pump the bellows. The German name for the clavichord was *Klavier* (that for harpsichord was either the Italian term *cembalo* or *Instrument*), and it was for the *Klavier* that Bach wrote the *48 Preludes and Fugues* to show that there were better ways available of tuning a keyboard instrument than either any normal variety of meantone or equal temperament; Well-tempering was not equal tempering — some keys were much better in tune than the equal temperament that we use on the piano today; see John Barnes's article in *Early Music*, April 1979.

A keyboard instrument which was invented around 1700 was Bartolomeo Cristofori's *gravicembalo col piano e forte*. When plucking a string mechanically, as with the harpsichord and spinet, it is impossible to make more than a very little difference of loudness by finger pressure on the key. When striking it, however, a much greater difference is possible. Hence the Italian name for the instrument, a keyboard instrument with softness and loudness. This first version of the piano, a keyboard instrument whose strings were struck with hammers, was comparatively unsuccessful in its day, partly because this type of expression in music was not yet desired, but chiefly because the light stringing then in use was more suited to plucking than it was to hammering. Bach did not much like Silbermann's version of the instrument in Germany, and in Spain, where a number of Cristofori's pianos had been purchased for the Court with initial enthusiasm, many were converted into harpsichords. Not until the latter part of the eighteenth century, when

the Industrial Revolution made heavier strings available, which were more suited to hammering, did the piano come into its own.

The other main keyboard instrument was the organ. In Germany and the Low Countries this had already reached its Baroque form by the early seventeenth century, as can be seen in Praetorius. It was a large instrument, divided into discrete sections which could be contrasted the one with the other, known as *Werkprinzip*. There were, as a rule, three manuals or keyboards, each controlling a complete organ, with treble and bass ranks of pipes and choice of sonorities, but each producing different types of sound.

One manual controlled the positive, usually placed behind the organist's bench, *Ruckpositif* in German, and because it was behind or sometimes under the bench, Chair organ in English, which was transmuted into Choir. Another manual controlled the *Brustwerk*, placed in front of the organist. This was often provided with doors that could be opened or closed to increase or diminish the amount of sound produced, the Swell, which was invented in Spain in about 1700. The third manual controlled the *Hauptwerk*, the Great in English, placed higher up. In addition, there were low bass pipes, controlled by a pedal keyboard. While all this could be coupled to play together, the normal practice, in Germany at least, as can be seen in Bach's music, was to contrast one section with another, so that the Trio Sonata, a number of which Bach wrote for the organ, was indeed three distinct voices working against each other.

When one considers the tremendous variety of sonorities available on these great German organs, it is a constant surprise in modern performances of Bach's Cantatas and other works to hear the organ part confined to a small chamber organ, the equivalent of the *Ruckpositif* alone, instead of being played on the magnificent instrument which was a standard feature of all great German churches.

The French organ differed in style from the German. It was often equal in size, but instead of the division into three or four organs within the one case, its main feature was the use of the *grand jeu* and the *plein jeu*, the full organ, used in contrast with a selection of solo stops. To a great extent, the late nineteenth-century English organ, which is still the norm today, was a lineal descendant of these French instruments, and this, also to some extent, is true of the nineteenth-century German organ, which is why Bruckner's, Reger's, Liszt's, and other nineteenth-

century organ music is so different in concept, as well as in musical style, from Bach's.

Spanish organs again were large, so large that they were often built in two halves that could be coupled together, one on each side of the choir, and like the French they were noted for their solo stops. A special feature was the *trompettes en chamade*, horizontally projecting pipes with very loud reeds. It must be quite shattering to stand between the two halves of such an organ! It was around 1700 that the swell was invented in Spain.

Only in England, and often in Italy, were organs less developed, for separate pedal sections were unknown in England until late in the eighteenth century or after. Thus Handel's organ writing differed sharply from Bach's, for not only had he no separate pedal available, but also there was less possibility of contrast between the manuals. The only pedals, and they were fairly rare, pulled down the lowest octave of the manual, which did at least allow one to use both hands higher up on the manual and add a simple bass with one's feet. Although English organs often had only the one manual, some contrast was possible by splitting the registration in the centre of the keyboard, between middle C and C#, so that one could contrast, for example, the Trumpet Tune in the treble with diapasons in the bass. Nevertheless, English organ writing in the Baroque was often much closer to that of other keyboard instruments — melody and accompaniment in the same sonority, and also contrapuntal within the same sonority.

The simplicity of the English organ was mainly a result of the Puritan destruction of almost all pre-Commonwealth organs, something from which many English churches failed to recover until the late nineteenth century. However, although this was a pity for organists, it led to something which was of great importance to English life, and was unknown on the Continent, the Church Band. To what extent this existed in the Baroque, we do not know. What we had then, and to some extent still preserve today, especially in Scotland, is the custom of chanting the Psalter without accompaniment, which again is directly due to the lack of organs.

It is arguable that the baroque woodwind was created because of a king's vanity. Louis XIV of France fancied himself as a dancer, but the ballet outdoors, in the gardens of Versailles, where it was often performed, was unpleasant in winter. The standard accompaniment to the ballet was *Les Grandes Hautbois du*

Roi. The *Hautbois* was intolerable indoors and therefore the *hautbois*, meaning shawm, was remodelled into the *hautbois*, meaning oboe, a duplication of name which is typical of the confusion which so often exists with instruments. This change probably happened in Paris under the leadership of the Hotteterres and their associates, musicians and instrument-makers to the French court, though there seems a possibility that the inventor of the oboe was Richard Haka, who was born in London but who worked in Amsterdam.

The oboe was made in three joints, instead of in one piece of wood like the shawm, with a narrower bore than a shawm, and a longer reed which was fully controlled by the lips. Because some players still played left hand over right, whereas others played right over left, as everyone does today, the long key (reaching down to the lowest note, middle C) had a forked touch, and a shorter key (for E \flat) was duplicated because both had to be accessible to either little finger. This was necessary because, unlike the traverso and the recorder, the keys were on the body, above the joint between the body and the bell or foot.

The change from shawm to oboe resulted in a complete change in tone quality, range, tuning, and volume. The oboe became the leading wind instrument of the baroque orchestra — the traverso was not yet fully respectable (and not very suitable for orchestral use) — the recorder was even less useful in an orchestra. This dominance of the oboe continued through much of the classical period.

There were four sizes of oboe in the Baroque: the normal instrument; the oboe d'amore, a minor third lower; the tenor, a fifth down; and the bass oboe, an octave down, but although this size existed it was very rare. To complicate things further, there were three types of tenor: the normal instrument, simply looking like a large oboe; another straight instrument but with a bulb bell; and a curved instrument with a flared bell, either of wood or of metal. The tenor with the flared bell is presumed today to have been the oboe da caccia. One must stress the 'presumed to be'; no instruments survive with a label attached, nor is there any illustration yet discovered with a caption. What was the *taille*, a term often used? We can only assume that it meant either (or both) of the other two tenors.

The normal bass to the oboes was the bassoon. Again the origin is believed to have been Paris with the Hotteterre group; more evidence is accumulating all the time that Denner of Nürnberg derived his patterns from the French. However, again there is a possibility of a Dutch origin, perhaps with Haka, for there is a

painting by the Dutch artist Harmoen Hals which is either earlier than any French evidence for the bassoon so far discovered or else not by Harmoen Hals.

As the oboe derived from the shawm, so the bassoon derived from the curtal or Dulzian. The main differences between the curtal and the bassoon are the bassoon's three-joint body, and the added bell, which takes the bassoon down to B \flat , a tone below the curtal's 8-foot C. However, Mersenne refers to a basson which went down to B \flat in 1636. That, and a three-joint curtal in the Vienna Kunsthistorisches Museum, and the Hals painting, show that there are still many gaps in our knowledge. The third and most important difference was the alteration of the function of the curtal's two keys, and the addition of a third key to produce the low B \flat .

The bassoon added a fourth key in the Baroque period to the original B \flat , D, and F. These are pitches produced by closing open-standing keys — close the B \flat key and B \flat speaks out of the bell; close the D key and D speaks out of the thumb hole (which is thus the D hole!). Keys are named by the note produced when they are operated; holes are named for the note that speaks out of them. The new fourth key was for A \flat , and is the equivalent of the oboe's E \flat key (the bassoon's F key is the equivalent of the oboe's C key). The bassoon is a curiosity among the woodwind, for its six-finger note G is equivalent to the oboe's six-finger D, and everything below the F key (from the bottom of the butt to the top of the bell) is a bass extension with holes operated by the player's thumbs.

The bassoon was an essential bass instrument, often not specified but assumed in the *tutti bassi*. It was certainly assumed in the early classical orchestra, along with the specified 2 oboes and 2 horns. The contrabassoon, which was occasionally used both by Bach in Germany and by Handel in England, sounded an octave or so below the normal instrument and was simply built as a double-size bassoon.

The Renaissance flute and recorder were both one-piece instruments. They were remodelled c.1670-80 by the Hotteterres and their associates in Paris. The modifications included both an acoustical improvement, deriving from the conical bore with a cylindrical head — these are the only wind instruments which narrow downwards from the top, and a technological improvement due to the division of the body into three joints, head, body, and foot. The importance of the narrowing bore is that if a flute is to sound its upper, overblown notes in tune, there must be some conicity in the bore. The advantages of the body division are that shorter

reamers can be used on the bore, with less whip and therefore greater accuracy, and that separate reamers can be used on each joint. Also spot-reaming becomes easier, which can improve the tuning of certain notes by making small alterations to the bore at critical points. A further advantage is that there was now one less fingerhole on the recorder, for the foot can be turned to suit either the left or the right little finger. However, the French had to change the recorder's name from *flûte à neuf trous* (thumbhole, six fingerholes plus two little-finger holes) to *flûte douce* or *flûte à bec*. A further advantage for performers on the traverso was the introduction of the E \flat /D \sharp key. Chromatic notes were produced by cross-fingering but this was not practicable on the lowest note of the traverso, and half-covering the lowest hole was awkward, which is why the E \flat /D \sharp key was provided.

The results of these modifications were changes in tone quality, tuning, range, and volume, and the creation of the baroque recorder and the baroque and classical flute. We should not be referring to 'flute' in this context — 'flute' in the baroque period always meant recorder — what we call the flute today was then called *traversa*, *flauto traverso*, *flûte d'Allemagne*, German flute, etc — it was always adjectivally qualified even into the early nineteenth century.

By the 1720s, the traverso was further modified to four joints by dividing the body into upper- and lower-body with three fingerholes in each, with the dual advantages of the use of shorter reamers still and of the use of *corps de rechange*, a set of upper-body joints each slightly different in length and thus in pitch. There was then no standard pitch, and these joints of different lengths allowed for different pitches, as the tuning slide does today.

The recorder was often regarded as more suitable than the traverso for serious music, especially for chamber music. It was made in various sizes. The treble was *the* recorder unless otherwise specified. Smaller sizes such as the fourth flute in B \flat , the fifth flute in C (our descant), and the sixth flute in D were used for special effects. The voice flute, a tenor in D, seems to have been made for playing traverso music. The bass, whose sound was much stronger than that of any modern bass, was a potential continuo instrument. There are still several mysteries: for example, what was the *flauto d'echo*? Comparison of the scores of the *4th Brandenburg* and the later keyboard version, the *F major Concerto*, makes it quite plain that there was an instrument available in Brandenburg, which, unlike the normal recorder, which goes flat when blown too gently and sharp when blown too hard, could

produce a true *forte* and a *piano* echo, which was not available in Leipzig a decade later.

Up to the mid-seventeenth century, the chalumeau was either an indeterminate term for any reed instrument or a folk instrument with an integral single reed. Before 1700 it became a short, clarinet-like instrument with a separate mouthpiece and a tied-on reed, about descant recorder length, with 2 keys. Information is scanty; very few chalumeaux survive. We know, from surviving music, that there was a complete family, treble, alto, tenor, bass. We know that “J.C.Denner improved the chalumeau” but we do not know whether those that we have are pre- or post- the ‘improvement’. J.C.Denner also produced larger, treble recorder size instruments — are these his improved chalumeau? Colin Lawson, in his book on the chalumeau, suggests that they are alto chalumeaux and that they are likely to be Denner’s improved model.

There is a basic problem with all reed-blown cylindrical-bore instruments. They behave as a ‘stopped pipe’ in acoustician’s terms. They overblow a twelfth, not an octave, and they therefore need ten fingerholes for a diatonic scale instead of six:

Not X 0 0 0 0 0 0 Z,
C D E F G A B C,

but X 0 0 0 0 0 0 0 0 0 Z
C D E F G A B C D E F G,

where X represents all the holes covered, 0 each hole opened in turn from the bottom, and Z all the holes covered again except the octave hole or key. Therefore they have to add to the normal six holes a little-finger hole at the bottom, a thumbhole, and two keys, one of which acts also as a speaker to help overblow into the upper register, and therefore has to compromise in its position.

One advantage of a reed-blown cylindrical bore is that it sounds an octave lower than a flute of the same length, about a 6th below an oboe (because that completes its cone inside the player’s body when it is blown). Thus the lowest nominal (written) note of the earliest clarinet was the F below middle C even though it was much the same length as the traverso, whose lowest note was D. Opening

the holes in an approximately recorder-like sequence gives a diatonic scale up to G. Opening the speaker gives A. Opening the front key gives B \flat . Opening both keys give B \natural . This is according to Eric Hoeprich in *Galpin Society Journal* 34, who proves previous authors to be wrong; we have all said that both keys give B \flat and that therefore the B \natural is missing — note, however, that not everyone agrees with Hoeprich on this.

The clarinet provided a flared bell, instead of the chalumeau's recorder-like foot, and then added a third key for the lower thumb. This key, when it is closed, is said to fill the gap at the top with B \natural and to provide a new lowest note E. If Hoeprich is right, and there was no gap at the top, why was this third key added? Hoeprich suggests to move the keys as they are on the classical instrument so that opening the speaker gives G \sharp , opening the front key gives A, opening both gives B \flat , in the fundamental register, and closing the new third key and opening the speaker gives B \natural in the upper register. Clarinet key terminology is confused; some authors name the keys by their pitch in the fundamental register, and some by their pitch in the overblown register. It is safest to use both, as is done in the Bate Collection: for example E/B key for this new third key.

The three-key clarinet was a viable instrument, as can be seen from the *clarinette d'amour* in the Bate Collection. It was improved by adding a fourth key for A \flat /E \flat for the thumb, which was the equivalent of the E \flat /D \sharp on the traverso and oboe, and then a second long key (closed-standing) for F \sharp /C \sharp . It was not considered practicable to have two long thumb keys, and they had to be moved to the side of the instrument. It was certainly not practicable to duplicate them for each little finger, and it was therefore with the clarinet that players had to decide whether to play with the right hand over the left or vice versa, and left over right became the established practice. Both long keys were therefore fitted for the left little finger.

Why was the clarinet so slow to be adopted? We can only guess, but:

- a) the 4-key clarinet = 1-key flute (ie it was more complex);
- b) the clarinet was poor at cross-fingering, and it was therefore necessary to have C, B \flat , and A instruments for playing in different keys;
- c) Conservatism — it had no historical background. The traverso derived from the Renaissance flute, the oboe from the old hautbois, the bassoon from the curtal, but the clarinet from nothing but a little-used folk instrument. As a result

there were few players, and therefore little music was written for it; as there was little music written for it, few people bothered to play it.

The trumpet was the first wind instrument established in baroque use, late in the sixteenth century (it had long been a military instrument). Below the 8th partial (see the chart of the Harmonic Series below) only fanfares were possible; above the 8th partial players could produce diatonic melodies, and therefore if it were to be used in orchestral music, players had to explore its potentialities.

By 1607 (in Monteverdi's *L'Orfeo*), players had reached at least to the 13th partial, and must therefore already have acquired the technique to lip the 11th partial (halfway between F and F \sharp) and the 13th (a very flat A) into tune — nobody in their senses (though several writers have done so) can claim that composers wrote notes that they knew would be played out of tune in the hope that one day someone would invent a mechanism that would allow them to be played properly.

It is important to remember that toccatas like that of *L'Orfeo* were normally improvised — the *alto e basso* part might be written, the *quinta* and the *clarino* improvised above, and the *vulgano* and the *basso* improvised below. *L'Orfeo* is one of the few written out examples, and this tradition continued for 150 years to 1750s, or even 1790s. The trumpet became the most important baroque brass instrument. Its use in Germany was rigidly restricted. It could only be played by members of the trumpet guild — non-members usurping the privilege were liable to have their teeth bashed in, and entrance to the guild was by restricted apprenticeship. Trumpeters could only be used by licence, and licences were restricted to the higher grades of the nobility, to licensed regiments, licensed towns, and licensed occasions. It is instructive to look at the occasions on which Bach was able to use trumpets in cantatas. Use was less restricted elsewhere, but everywhere the trumpet was associated with royalty, with pomp, and with ceremony.

The trumpet was also a chamber music instrument — in the *Second Brandenburg* it was on equal terms with the recorder, oboe and violin — the recorder, not the Boehm flute; the baroque violin, not the modern violin — and it did not drown them. This was true not only in Germany, where there is much other chamber repertoire, but also in Italy with Torelli's and others' sonatas, and in England with the trumpet tunes by Purcell and others, not all of which were written for the trumpet stop of the organ.

There were sporadic attempts in the Baroque at producing chromatic trumpets — Talbot describes the flatt trumpet with a backward-moving slide, which was used by Purcell for the *Queen Mary Funerall Music*. The *tromba da tirarsi*, with a long mouthpiece stem which could be drawn out of the first length, or yard, of tubing, was known in Germany, where Bach wrote for it occasionally in chorales. Both can be seen in the Bate Collection, and both were only suited to slow music.

The only fully chromatic treble brass instrument in the early Baroque was the cornett. It played the top line in choirs and also the top line with sackbuts. There were three types, the normal cornett which was slightly curved, a straight cornett, both with a separate mouthpiece shaped like a tiny trumpet mouthpiece, the size of the cup in which an acorn sits, and the mute cornett, also a straight instrument but which had a horn-type mouthpiece carved integrally into the upper end and was therefore quieter. In the Renaissance and early Baroque, the cornett was the great virtuoso instrument, much used for divisions, as variations and improvised ornamentation were then known, but it was seldom used by Bach's time.

The sackbut, as the trombone was called in English, was used mainly with voices. It was, from the time of its invention late in the 1400s, fully chromatic. It was built in four sizes, alto, tenor, bass, and great bass, which last had died out by Baroque times. It has changed less than any other instrument since then, acquiring from the eighteenth century onwards, a rather more sharply flared bell, stronger joints between the sections, stockings (added thickness to the ends of the inner legs of the slide) and, most important for its sound quality, thicker metal.

The horn came late into the Baroque orchestra, not till about 1700, by which time it was twice the length of the trumpet. Because it was twice as long, it was easier to play in the upper register and therefore louder than the trumpet — it was very obviously not a chamber music instrument in *Brandenburg no.1*. At first horns were built in one key only, so that changing key meant changing horn. Crooks, different lengths of tubing which could be inserted between the mouthpiece and the instrument to change the tube length and thus the key, came into use some time in the second quarter of the eighteenth century and were then usually a master crook, which accepted the mouthpiece, and couplers which were added as necessary between the master crook and the body of the horn. In the early 1700s the bore was widened and as a result the tone quality was much improved and much less harsh; by the time that Bach was writing the *B minor Mass*, the

horn was clearly a much more ‘musical’ instrument. It was still played with the hand out of the bell (unlike most modern performances of Baroque music), with the 11th and 13th partials lipped into tune. Not till the mid-eighteenth century did Hampl invent hand-stopping.

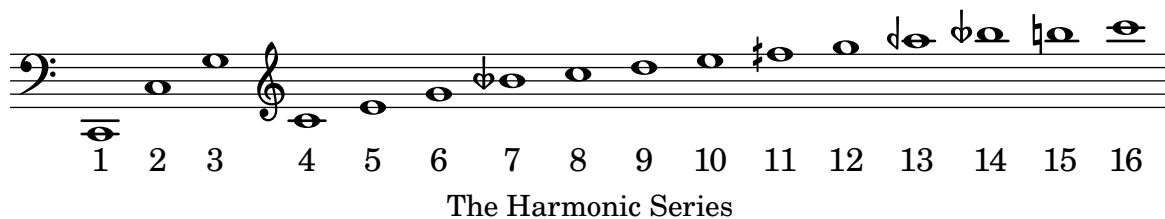
In the Baroque orchestra only one percussion instrument was of any importance, the timpani. Timpani were carried on horseback in cavalry regiments as part of the trumpet squad, whereas the artillery used larger drums, which were drawn on a chariot as part of the Train of Artillery. Timpani were also ‘civilian’ instruments and here again served as the bass trumpet. Their parts were usually improvised, and their presence can usually be assumed when there are trumpets. Timpani were usually small and shallow, and were played with wooden sticks.

Composers began writing specifically for timpani around 1700. Timpanists were still expected to elaborate on their parts (compare the Mozart edition of *Messiah* with Handel’s original — the tradition was dead by then, so Mozart had to write out what Handel’s drummer would have improvised). For special occasions, Handel used to indent for a pair of artillery drums from the Armouries of the Tower of London. These were known as double drums, and the Bate Collection has the only known surviving pair. Timpani were tuned with a loose key, which was slow and noisy, but until Beethoven’s time, players hardly ever had to tune during the music, and anyway only had to tune in the ‘trumpet’ keys of C and D.

Most of the instruments referred to in this Handbook can be seen in the Bate Collection. Illustrations of many can be found in the books and periodicals which are listed on the next page, and the bibliographies in those works will lead to the more detailed studies available on each type of instrument.

THE HARMONIC SERIES

The first 16 partials, from the Fundamental to 'top C' are listed below; players were occasionally expected to go as high as the 24th. Harmonics double at the octave; thus only the odd-numbered partials above these 16 provide new pitches: 17 gives a good C \sharp , 19 a good E \flat , 21 a flat F \sharp , and 23 a sharp F \sharp . Both 21 and 23 are better than 22 (and 11), which are exactly halfway between F and F \sharp . 11 and 13 (halfway between A \flat and A) are the partials which Burney and others complained of; a good player, such as Crispian Steele-Perkins, can bend them into tune, but less good players often failed to do so, which is why pseudo-baroque trumpeters today use trumpets with fingerholes (which did not exist in the Baroque) and pseudo-baroque horn players hand-stop (which was not done in the Baroque; the technique was introduced c.1750). Both are easy expedients to fake the music.



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The Galpin Society Journal

The Historical Brass Society Journal

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