Jeremy Montagu

The Orchestra in History

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Jeremy Montagu

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The beginnings

It is difficult to say when the history of the orchestra begins, because of the question: where does the orchestra start? And even, what is an orchestra? Does the Morley *Consort Lessons* count as an orchestra? What about Gabrieli with a couple of brass choirs, or even four brass choirs, belting it out at each other across the nave of San Marco? Or the vast resources of the Striggio etc *Royal Wedding* and the Florentine *Intermedii*, which seem to have included the original four and twenty blackbirds baked in a pie, or at least a group of musicians popping out of the pastry.

I'm not sure that any of these count as orchestras.

The Morley *Consort Lessons* are a chamber group playing at home; Gabrieli's lot wasn't really an orchestra; The Royal Weddings and so forth were a lot of small groups, of the usual renaissance sorts, playing in turn.

Where I am inclined to start is with the first major opera, Monteverdi's *L'Orfeo*. Even that tends to be the usual renaissance groups taking turn about, but they are all there in a coherent dramatic structure, and they certainly add up to an orchestra. The basis was, as it still is, the string instruments. It is arguable that the orchestra and orchestration could not start before there was

a coherent group of strings to form the basis, especially to form the basis of a multi-voice group; everything earlier was one to a part. It is, perhaps the concept of multi-voice that gives us the clue. Any group, however large, where each player has his or her own individual part is a chamber ensemble; once you start getting more than one player on a part, you have an orchestra, however small. However, the instruments which Monteverdi used were certainly available by the mid-1500s or before; if we regard this as the first orchestra, it seems to be more the new music, and the new musical styles changing the use of something that was already, there than the availability of something new changing the music and the musical styles.

L'Orfeo demands 10 violins (sizes unspecified, but violins in this sort of context normally means members of the violin family, from treble to bass), plus two double basses, plus a couple of piccolo violins, but they are for a solo spot, as are the arpa doppia, the 4 trombones, the regal, the three bass viols, the two cornetti, the sopranino recorder, and the clarino with three other trumpets (there are five parts!) and the timpani which I believe were implicit in the trumpet squad. In addition, there are 2 harpsichords, 2 chitarroni, and 2 organs, and these with the 2 double basses are the most important section of the orchestra. The continuo was the heart of the orchestra for 200 years. The continuo keyboard was often played by the director, as we shall see in future sessions, it held the whole thing together and, as a minor detail (though today this is often erroneously thought of as its main function), it filled

in any missing bits of harmony, especially through recitatives and solo passages.

The continuo today is a pale and feeble shadow of what it was. Practically never was it just one harpsichord. There were normally two, as in *L'Orfeo*, one for the director and one for the continuo player; the latter was the harmony-filling boy, whereas the director would be putting in cues, controlling tempi, adding anything he felt like, and so on. The same applied with the organ; there was often more than one. Nor did it stop there; as in *L'Orfeo*, there were the large lutes, large citterns, anything else, such as harps, that could do the job and could add diversity.

L'Orfeo starts with a *Toccata che si suona avanti il levar de la tela tre volte con tutti li stromenti*. The 'tre volte' is a tradition that goes much further back, that we meet in *The Hunting of the Snark* ('what I tell you three times is true'), and that still survives in the French theatre with the three hammer blows which come at the beginning of any performance. The toccata, which is the only time the trumpets are heard, is a tremendously exciting sound still, even after 394 years (it was first heard in 1607). The strings play as a band in various ritornelli and with the chorus and for dances. If you are not familiar with this score, you should both read and listen to it (even though I find no recorded performance wholly satisfactory) because, as far as dramatic music was concerned, this was the model which was followed for the most of the seventeenth century.

So what were these instruments? The trumpets were natural trumpets, of course, producing the partials of the harmonic series of C, the fundamental, which was in tune on the trumpets of this period, although it wasn't by the time that we get to Bach's style of trumpet (on those later trumpets it's badly sharp); then tonic an octave higher and fifth in the bottom octave; tonic, third, fifth, in the middle octave; tonic, and a diatonic scale in the upper octave. The violins were short-necked, with nearly an inch shorter string length than today, and with a smaller range, though that was a matter of playing technique more than construction, and of course all gut strings. The viols were somewhat different from the baroque viol, six-stringed with frets on the fingerboard. The chitarroni were long-necked lutes, with six courses on the fingerboard as usual, plus long open bass strings. The harpsichords were almost certainly single-manual, probably with two sets of 8′ strings which could be used either singly or together, and perhaps a 4′ choir as well, so that some change of sonority was available. The organ is specified as organo di legno, ie with wooden pipes, so just diapasons. The only organ reeds were on the regal which only appears in the Hades scene, a sharp snarling sound.

A similar violin band had grown up in this country, deriving from the initial players and instruments brought here by Henry VIII's Italian musicians. The full details, including the stages through which this royal band developed into an orchestra, will be found in Peter Holman's *Four and Twenty Fiddlers*. Peter makes the point that this court orchestra started here and was copied

in France, where it became, by 1630, the Quatre-vingt Violons du Roi, of Louis XIII. Mersenne in 1636, in his *Harmonie Universelle*, which is in the library here both in facsimile from his own copy and in a slightly unreliable American translation, describes them as 6 violins, 12 violas in 3 sizes but all tuned to the same pitches, and 6 basses. This was the nucleus of Lulli's orchestra, who had come to Paris from Italy. It was brought back to this country by Charles II on his Restoration, and this was the orchestra for which Purcell wrote his dramatic and other music, the orchestra for all the Stuart masques and all the other entertainments, as well as for the church anthems. It is still the basis of our symphony orchestra today. Mersenne is an excellent source of information on all the instruments of the first half of the seventeenth century. Most instruments are illustrated, with varying degrees of accuracy (he had at least three artists, one excellent, one not very accurate, and one decidedly ropey). Most are described with a good deal of detail, though usually without just the small details which one really wants to know, but nevertheless with far more information than we have from elsewhere. The advantage of the facsimile is that it was done from his own copy and it includes a fair amount of extra material, some, but by no means all, illegible in his very cramped handwriting; with this work and Prætorius's *Syntagma Musicum* of 1619, we know far more about the instruments and their use up to the 1630s than we do for anything over the next hundred years). Prætorius is also available in facsimile and, except for all the material on organs, in translation (but do

use the Crooks translation, which is quirky but tolerable, and not the older American one which is grossly inaccurate). He has not only detailed descriptions but also scale engravings of all the instruments. Be careful of the scale; it's the Brunswick foot which is slightly smaller than ours. Be even more careful of the tipped-in manuscript scale drawings in the facsimiles, because they're a reduced size.

However, don't assume from what I've said about the Lulli orchestra that it sounded like the string section of the Royal Phil. The pitch was probably as much as a whole tone below modern pitch (don't believe anything you hear about there being a baroque pitch; pitch varied from time to time and place to place, but we do know that in Paris from say 1670 to about 1700 and perhaps up to 1750, it was around A=392, just about a tone below modern. So if you have perfect pitch, mentally transpose everything down a wholetone. Tone quality was also very different; as with Monteverdi, strings were all gut and quite thick and at much lower tension than today, bows had less hair and were also at lower tension, so that all sounds were less bright, but also less harsh and with more of a glow — much more suited to accompanying the human voice. So far as I know you won't hear anything like this on any recording, though we are beginning to get there.

What happened to the band in France is a little difficult to determine. The only Lulli scores in our library are a very poor Collected Edition, the worst type of French scholarship. Seldom are instruments specified; only sometimes are original clefs given

(this is very important when one is trying to guess which instruments are involved); quite often the listed instruments are clearly wrong. In the Royal Library in Versailles there is a vast number of volumes in the most beautiful handwriting of Philidor and his colleagues, and almost certainly all the information we need is there, but the editors seem to have relied on poor printed editions of the period. Occasionally they give details. One motet, Domine Salvum (undated!) specifies:

Premier Dessus de Violon	in french G clef
Second Dessus de violon	in french G clef
Premier HautContre de violon	in french G clef
Second HautContre de violon	in soprano clef
Taille de violon	in alto clef
Quinte	in tenor clef
Basse	in bass clef
Basse continue	in bass clef

You know, I hope what these clefs were; in case not, French G clef is treble-clef G on the bottom line, the normal clef for violins at this period, and often, when no instrument is specified, a clue that it may well be violin; soprano is C-clef C on the bottom line; alto, tenor and bass you surely know. Of the instruments, Taille de violon was certainly what we call a viola, as was Quinte, and so, at least sometimes, was HautContre (Mersenne's three sizes, Taille the medium, Quinte, the largest, and, when it's a vi-

ola, Hautcontre the smallest, which he says categorically are all tuned to the same pitch, the same four notes that we use today); the two Dessus and probably the upper HautContre were violins. Double basses are never specified, and whether they can be assumed gets debated. Since they certainly existed, it seems to me improbable that they were not used, but there is no way of being certain unless detailed paysheets survive, and I don't know whether they do from Versailles at this period.

To this was added a certain amount of wind. There were several bands at the French Court: the Quatrevingt Violons, the Douze Grands Hautbois, the Musettes, and so forth. To some extent they overlapped; many of the same players turn up in the Hautbois and the Musettes, and so on. The Hautbois were the loud boys, the outdoor band of shawms and sackbuts, and for many of the Ballets, which were danced outdoors in the garden, this is what Lulli was writing for. At some stage in Lulli's career at Versailles, the Hautbois moved indoors, where the loud shawms would have been intolerable, and became the oboes, still called Hautbois. It is not easy to be sure just when this happened. Certainly by the mid-seventies; probably in the mid-sixties; possibly in the mid-fifties. One has to judge each score on its merits and see whether the hautbois, for the name was the same whether it meant shawm or oboe, loud or soft, whether the hautbois played with the violins, in which case they were oboes, or in contrast to them, in which case they may have been shawms. Certainly when, on a few occasions, the score also says bassons, as in the

1664 *Miserere*, they must have been oboes, to which the bassoon was the bass; equally when the score bothers to say Hautbois fort, as in *Alceste* of 1774, they must have been oboes; there is no need to specify fort for the shawms, for they were never anything else.

There were also flutes, and since Lulli sometimes specifies flûtes allemands, those which just say flutes must have been recorders. (This is something we shall go into in more detail next week). Horns appear only for hunting scenes, and one suspects that these indicate outdoors. One ballet, *Les Plaisirs de l'Isle Enchanté*, first danced in May 1664, has a number of quite specific musical directions, and I'm pretty certain it was an outdoor occasion. There was a 'Marche pour les Hautbois' in five parts, two on treble clef, 2 on alto and one on bass, and this was, I think, the Douze Grands Hautbois du Roi, the shawm band; it is a pretty typical line-up. There is 'une agréable harmonie de flûtes et musettes' (musettes were small bagpipes with adjustable drones); there are 'Trente-six violons, très bien vétus', and later there are 'Seize Faunes, dont les huits jouèrent de la flûte et les autres du violon. Trente violons leur repondoient de l'orchestre, avec six autres concertantes de clavecins et de théorbes'. They are again in five parts. Quite an elaborate orchestra.

Trumpets appear quite often, though I have a strong suspicion that our printed scores are misleading, since some of the printed music in the lower parts is unplayable on natural trumpets. Six trumpets and one pair of timpani are specified in *Les Amants Magnifiques* of 1670, but again the parts are not all playable on

trumpets. It will only be possible to sort out how many trumpet parts there were by checking in the Versailles library or when a better Lulli edition becomes available. Timpani were sometimes multiplied; there is a Philidor march for two pairs of timps with two players, with very elaborate ornamental beatings, an indication of what players might have done when reading the fairly simple Lulli parts.

The wind instruments themselves will have been the first models of the baroque wind. The flûtes allemands, the transverse flutes, and the ordinary flûtes, the recorders, were exactly as Hotteterre illustrates and describes them in his *Principes de la Flûte Traversiere* (this also is available in facsimile and in translation), the transverse flutes with a single key for D♯, with D as its lowest note (we have a reproduction of the Leningrad flute allegedly by Hotteterre in the Bate; only three survive, one in Graz, one in Berlin, and the Leningrad, and of these three only that in Graz seems certain to be genuine and not a later copy). The recorders were very similar to those by Bressan in the Bate Collection. The oboes had three keys, the E♭ duplicated so that it could be accessible to either little finger, for some players played with left hand above right as we do today, and others with right above left, and a C key for the lowest note. The bassoons had only three keys, for F, D, and B♭, again the lowest note. Trumpets and horns were, of course, natural instruments with no artificial aids; they sounded only the partials of the harmonic series, and players depended on their lips to pull the dicier of these into tune. Horn players

didn't put their hands in the bell, and trumpeters didn't have little holes to cheat with. Timpani were small, with thickish skins, played with wooden-headed sticks, which produce a pure tone, a very clear pitch, and a very precise rhythm, quite different from the woolly sound of the modern plastic-headed timps played with felt-headed beaters, and very different indeed from wooden sticks on plastic 'skins'.

This was the orchestra that Charles II brought to London on his Restoration, and the orchestra that Purcell inherited.

Purcell's theatre music was somewhat less elaborate than Lulli's, and it's worth noting that the string section in this country was normally in four parts and not five; the violas were seldom divided (a notable exception being the *Fantasia On One Note* where the second viola sits on middle C throughout, and some of the *In Nomines* where four parts weave round the very long-held notes of the plainsong). While he does use trumpets and timpani as a group, he more frequently writes the Trumpet Tune for one solo trumpet and strings, something that was very much an English tradition. The woodwind are the same as Lulli's indoor band, the oboes and bassoons, sometimes recorders and less often transverse flutes. Much of his theatre music was just for strings, but this may have been a matter of economics, something that we still see today, with theatre managers telling composers that they cannot have an orchestra that size. Most of the London revival musicals have smaller bands today than they had in their original productions ten or twenty years ago.

The masques were often more elaborate musically and with larger orchestras; it depended on how elaborate a show the sponsors wanted to present and how much money they were willing to spend. Again a common phenomenon today.

Of the instruments that we have been talking about, the violins of all sizes can be seen in the Ashmolean Museum, and also Monteverdi's viols. One of the oboes can be seen here in the Bate (we have the oldest oboe in England, dating from about 1680 or 90), but our earliest bassoon is of the Bach period. We have a reproduction of the German or transverse flute, which may or may not be by Hotteterre in the Leningrad Museum, of about 1680. Our Bressan recorders are later, about 1700, but very similar to those of this period. We have one of the few original surviving Stuart trumpets, the Simon Beale of 1667, and the Ashmolean has a slightly later one by William Bull, a magnificent piece of silver (you'll have to hunt for it among the flagons and salvers in the Silver Gallery; it's not in the Hill Room with the other instruments [it is in the Hill Room now]). Our Bennett horn must be very similar to those of this period, though it is undated; it's anything from 1680 to 1710. Our timpani are all later. The Ashmolean instruments can only be looked at, but ours can be played as well by anyone who wants to know what the music of Lulli and Purcell sounded like in their own period. One thing to remember, as you'll discover if you come and play them and as I have already mentioned, is that the music was at least a tone lower than we are used to nowadays. When you play a piece in C major, it

sounds at modern B♭ major, and this is an element of its character which you must keep in mind. It wasn't played in Equal Temperament either, and that makes a big difference. C major in B♭ in meantone is a very different sound to what you may expect if you read the scores with modern ears, and this is one of the great dangers of being an armchair musicologist (we have a fairly simple Bate Handbook on *Tuning and Temperaments and why we do it* if you're not familiar with this subject, as well as a rather more complex one by Mark Lindley). There really is no substitute for doing the research and then finding players willing to learn the older instruments or their reproductions, training them to play in the right temperaments and styles, and then playing the music. But if you want to understand the sound of the music of different periods, and this is what the history of the orchestra, and for that matter musicology, is all about, it's sound, not dots on paper, and you have to go all the way. Original instruments at one person's idea of baroque pitch of A=415 or another's of A=430, will give you a false idea of the sound; equal temperament will give you a falser one, and performance on modern instruments will tell you what the dots were, but nothing at all about the music. On top of all that, I've not spoken at all yet about performance practice, ornaments, altered rhythms, improvisation or anything like that, which is just as much a part of the music as the orchestra.

We know, from Couperin's *L'Art de Toucher le Clavecin* (also available in both facsimile and translation) that the French custom was to play inégale; with pairs of notes, the first was often

slightly lengthened and the second accordingly shortened, and occasionally the other way round. It seems not to have usually been as much as a dotted note would produce, and the nearest equivalent is to say, as the jazz players did, 'swing it, boys'. Certainly Lulli should be played in this way. Arguably so should Purcell. I have a strong conviction, to anticipate by a week, that when Bach or Handel or anyone else of that period took the trouble to title a work or a movement in French, he meant it to be played in the French style. Ornamentation of course was expected. Cadences were never left bare but would always be trilled (shake was the English for trill in that period) or be ornamented with a back- or fore-fall, a grace note. Similarly leaps of a third or fourth were often filled with passing notes. Purcell's edition of Playford's *Introduction to the Skill of Musick* is instructive in this respect; he provides a table of ornaments, just as Couperin did. Very often no ornament was printed at a cadence because no-one but an idiot would play a cadence without one. The extent to which this affected the orchestra is difficult to establish; a soloist would certainly ornament; everybody would ornament a cadence; everybody would play any written ornaments, but probably orchestral musicians didn't do much about adding unwritten ones except when they had a solo passage. Certainly they would all have swung it. But then, there was the great difference between historical performances and modern ones: the composer was usually running the orchestra, and of course he would direct his own performance the way he wanted it. Purcell's widow may have

published all his *Aires from the Theatre*, but it seems likely that most performances in his lifetime were directed by him.

I haven't this week said anything about Italy post-Monteverdi. I apologise for this, but I'm afraid that it's due to ignorance. I don't know anything about Italian music of this period of the later seventeenth century. If there are scores in the library, and if you are interested, you can always bring them to me and we'll see what we can work out on the spot. The same, I'm afraid, applies to Germany. Schütz took home the Gabrieli brass choirs, but I have the feeling, as I had with Gabrieli, that these are really chamber ensembles, the old sackbut and cornetts, playing one to a part, and thus not what I'd consider an orchestra. He used strings to accompany at least some of his choral music, but I don't think (I don't know his work that well) that he used more than a four- or five-part string band without other instruments save the continuo.

I'm not certain that I've said enough about the continuo. We are today beginning to get back to something like the continuo of the seventeenth century; there are performances today of Monteverdi with half a dozen big lutes, theorbos, chitarrones or archlutes, whatever you want to call them. We still very seldom see more than one harpsichord; two take up space on the platform, cost money to hire, transport, and tune, and of course another player's fee, but it still drives me nuts to see Toon Koopman or Trevor Pinnock or Chris Hogwood taking his hands off the keyboard to direct the orchestra or the singers, and leave the continuo unplayed. That's why there was a second player, the general dogs-

body who did the routine continuo work, allowing the director to do just what Toon, Trevor, and Chris do. Maybe we'll get back to that one day, just as we are getting back so many other aspects of original performance. Maybe we'll even get ornamentation back. Too many people are frightened of it today: will the public stand it, will they accept it? The only way to find out is to try it, and to remember that once upon a time it was the only way to play the stuff.

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The High Baroque

We come now to the climax of the Baroque, with Bach, Handel, Rameau, and all their contemporaries, and we immediately rub up against a problem in identifying the orchestra, or rather the instruments of which it consisted. As always, our evidence lies in the scores of the music; if a Bach score specified saxophone, then we would know that Bach's orchestra included a saxophone.

Now nobody is going to be quite so stupid as to believe that, at least not around here I would hope, but there are scores on the market which are very nearly as misleading. Has anyone ever discussed editions with you? Which are reliable, which should be avoided, and so forth? The standard nineteenth-century texts are the Bach-Gesellschaft, the German Handel Society (edited by Chrysander), and then for the later periods the Mozart, Beethoven and Schubert Gesamtausgaben, all published by Breitkopf und Härtel. There was also an equivalent Peters edition of Bach and an English Handel Society (edited by Mendelssohn among others). A number of these are available in cheap miniature scores in Kalmus and similar editions, and in larger format from Dover, and all or most are available in the library here. All, or most, are unreliable, and for most of them the sets of parts are un-

speakable. There was an invincible nineteenth-century certainty that what the earlier composers really meant was..... Or that if they had had 'modern' playing techniques available they would have written.... This tends to affect the parts more than the scores. For example, the Breitkopf scores are usually taken from the various collected editions and are reasonably clean, though not always very accurate. The parts are very heavily edited, with lush nineteenth-century bowings and plenty of added dynamics, much in fact as the works were played in that period.

The best modern editions are the Bärenreiter Neue Bach Ausgabe and their Mozart edition, neither of which are yet complete. For Haydn, Doblinger is the best. Handel is rather a toss-up; the Hallische Händel edition is very patchy; for quite a while they forgot that Handel spent most of his life here and that all the autographs from about 1721 on are also here, and they used very tatty sources. There are problems with other composers, too, because a lot of the autographs were on the wrong side of the Iron Curtain and were for a while inaccessible, and there are still some important ones that have not surfaced. A snag is that Bärenreiter have not yet produced in their miniature score series all that they have published in full scores, and even when they have they are pretty pricey. A further complication locally is that, although Bärenreiter deny this, Blackwell's say that they do not stock Bärenreiter miniatures because they are too expensive. Some are available from Russell Acott who, on the whole, are now a better bet than Blackwell's for miniature scores; they seem to have

a much better range. Some Eulenburgs are OK, but it depends on who the editor was and when he edited it; a lot of their pre-war stuff from the 1920s and 30s is still in print and some of it suffers from the same problems as the Breitkopf full scores. Any Robbins-Landon is safe for Haydn, whether it is Robbie or his ex-wife Christa. Others I'm less certain about. Boosey and Hawkes is usually to be avoided except for the more modern composers whose copyrights they hold, for which of course there's no alternative. Penguin is to be avoided like the plague — cheap, inaccurate, and very nasty. Ricordi aren't much use either, though for Vivaldi they are often all that there are, and then they are very heavily edited; one has to remove everything that looks wrong and anachronistic by guesswork. As a general guide, it is worth checking on who the editor is and what you know about him and his general scholarly level. And as a general rule avoid, if you can, 'performing' editions; they always embody somebody else's idea of what the composer really meant. It's far better to be slaughtered for your own idiocies than for someone else's.

This discursion may seem irrelevant, but you may be surprised — how many Bach or Handel editions can you rely on to say Recorder when the original says Flute (which always meant recorder at that period), or to make it plain that it really was Traverso in the original by printing what Bach actually wrote in his manuscript? Even the Bärenreiter Neue Bach Ausgabe prints the trumpets and horns in the wrong keys and is often misleading in instrument nomenclature.

To return to our subject. As at the end of last week, the strings and the continuo were the nucleus of the orchestra in this period, and indeed the same will be true next week and the week after; even as late as the Beehoven piano concertos, the piano part has the bass figured in the tuttis, and I cannot believe that this was done just for fun. Long after it was no longer necessary for filling out the harmonies, the continuo still had a function. As I suggested last week it was the one part which could be relied on to keep everyone together; this is presumably why Salomon, when he advertised Haydn's London concerts, said that Signor Haydn would preside at the pianoforte; the public would know that with the composer in charge, the works would go as they should.

Bach's string parts, as a rule (we shall meet exceptions next week), were those we know in the modern orchestra today: two violin lines, one viola, and one bass, which was presumably both cello and bass though there are considerable problems about the last. We simply do not know the extent to which basses played an octave below the cellos. The bass, as today, was normally four-string, though in fact many are known to have been three-stringers, which implies a lowest note of A or G, a 3rd or a 4th below the cello; I trust that you know that while the lowest note of the cello is the 8′ C today, sometimes at this period it was the B♭ a tone lower. The lowest note of the four-string bass was the E a 6th lower than that, as it is today. But can one really imagine the bass lines, especially those of Bach, which are very linear in style, being broken as the players kept hopping up and down oc-

taves? Even if we accept that the bass was sometimes a violone, which is sometimes specified by name, a great bass viol with five or six strings, that does not solve the problem of all the bass parts. There is a considerable problem of sonority here, and one which is usually either ignored today, by modern-instrument bands, or fudged, by the early-instrument bands.

Handel's string parts, like many of the French composers' of both this and the previous generation, were slightly more elaborate, often with three violin lines and two viola lines, the 3rd violin and the 1st viola often being much the same. This suggests to me that in Bach's Germany viola playing reached a much higher standard than elsewhere, something which again we shall turn to next week, but that in France and England composers could not count on viola players being able to cope with highish parts and therefore doubled them on a third violin.

The continuo was much as last week, though the large lutes seem to have been rather less used; they never died out altogether, for we have a portrait of the Mozart family with Leopold playing a theorbo. For Church music, the organ was the normal instrument, and this applied also to the opera, where we have evidence for the use of two organs from Handel's performances, a big one and a small one. In Germany, in particular, we have the very large organs for which Bach and others wrote, and it is a continual surprise to me to hear the continuo parts being played on a box of whistles, a tiny chamber organ, when we have so many pictures of the choir and orchestra up in the organ loft with the magnifi-

cent great organ. Surely Bach would not have been content just to use a small part of the positive, the smallest part of the organ, when he had all the rest of it there under his hand? We know that organs were much smaller in this country, seldom with any separate pedal section, though often the bass octave or twelfth could be pulled down with the feet so that both hands could play in other parts of the range. Handel's small organ would have been something like the little one in the Rehearsal Hall and his big one like the one in Holywell; Bach's was very much bigger. One of Handel's harpsichords is now in the Bate; the small single manual by William Smith seems almost certain to be the instrument in Philippe Mercier's portrait of Handel.

The instruments themselves show little change from the previous period. Certainly there were changes in detail; Stradivarius, whose career more or less overlaps Bach's (he was born in 1644, 40 years before Bach, and died in 1737) produced newer models of violin, but these were the variations of an individual maker, however influential he may have been, and the general set-up remained the same, with short necks, gut strings, and the so-called Baroque bow. The Strad model was flatter arched, which did alter the tone quality. David Boyden, in his *History of Violin Playing*, which has a good deal of information on the instruments as well, describes the tone of the Strad model as oboe-like, whereas he describes that of the earlier Amati and Stainer model as flute-like. It may be significant to remember that the higher-arched Stainer and Amati model seems to have remained more popular in this

country for rather longer than elsewhere, if we can judge from what British makers were copying. You can see both Amati and Stradivarius violins in the Ashmolean, with some of the Amatis restored to original state. Our violins are usually out on loan, but if they're in, two are Amati model and one is nearer the Strad style.

Wind parts were becoming more standardised than they had been in the early seventeenth century, and one might say that they were more common than they were in the later seventeenth century. The instruments which we think of as the Baroque woodwind were all invented, probably in France, between 1650 or so, probably starting with the oboe and the bassoon, and 1685, the year when both Bach and Handel were born, by which time both baroque transverse flute and baroque recorder were certainly available.

The oboe was sufficiently a standard instrument in Handel's London that tutti in his treble lines usually implies the presence of oboes as well as violins (and then soli or solo would mean all the violins without oboes, not of just one violin). Again there is a linear problem here, for the oboe's lowest note was then middle C, whereas the violin's was the G where it still is; presumably the players were expected to sort it out as best they could. Handel is in fact a less linear composer than Bach, and as always, Bach seems to have been more specific, and when he wanted oboes, he named a line for them and wrote the parts appropriately. Perhaps

I should add that when Handel was writing specific oboe parts, as he also often did, he was equally careful about the range.

If I may digress briefly on to performance practice, as I did last week, it is quite clear that most composers expected players to improvise; the classic examples of this are the prints, both from Roger in Amsterdam and from Walsh in London, of Corelli's *Violin Sonatas* which, in the slow movements, have two violin lines, one what Corelli wrote and the other what Corelli played; the two are very different and repay study. I assume that these are all available in the Library here, but if they aren't, I have them at home and can bring them in if you are interested. The Roger edition is available in facsimile; I'm not sure about the Walsh. Another work worth looking at is Telemann's *Methodische Sonaten*, which show similar ornamentation, and which is available in the Bärenreiter complete edition. One can treat Corelli, Vivaldi, Handel and many others in this way, and one was certainly expected to, especially in those slow movements which consist of a simple progression of chords; these are very clearly the accompaniment to something that isn't there. Bach is another matter; when he wanted ornamentation it was fully written in, and indeed it's often an interesting exercise to clear out his ornamentation and discover the nuclear melody underneath. This same characteristic of specifying what he wanted seems to follow in his instrumentation also; there is very little coll'whatsit in his writing.

The transverse flute was becoming available. **It was *always* specified adjectivally —** the word 'flute' by itself *always* meant

recorder, and the instrument we call the flute was asked for either as traverso (Handel usually gendered it correctly as traversa) or traversière or as German flute, flûte d'Allemagne, and so on. Be careful here; this is why I was talking about editions; use a reliable edition which makes it clear which sort of flute was specified, for it makes a considerable difference to the sound and the balance. If a composer expected a recorder, a Jimmy Galway type belting it out on a Boehm flute is going to throw everything out of kilter. The traverso at this period (it is playing safe to refer to traverso and to recorder) had a lowest note of D a tone above middle C, only one key, and was very considerably quieter than the modern instrument, not only by its nature but because it was necessary to shade the embouchure to play any notes other than those of the D major scale in tune. The traverso is not very good at cross-fingering, which was the only way to produce chromatic notes before keys were added, and rolling the embouchure towards the lip both flattens the pitch, to tune it, and also makes the sound quieter. So here again, a modern flautist can upset the balance.

The recorder was not often an orchestral instrument; it was used in chamber music and as a soloist with small (I suspect often single line) string groups. Unless otherwise specified, one can normally assume that flute (ie recorder) means the treble (which the Americans and Germans now call the alto), with the lowest note F a 4th above middle C. Other sizes were used, particularly the 4th flute, a fourth higher, and the fifth flute, our descant. Tenor and bass seem to have been mainly used in recorder en-

sembles and perhaps other chamber groups, and the voice flute, a D tenor, seems to have been used as a substitute for the transverse flute by recorder players, but again this is not likely to have happened in an orchestral context.

The only other woodwind we need consider were the larger oboes and the bassoon. The clarinet certainly existed, for it was invented before 1700, but orchestral parts do not appear in anything that we consider standard repertoire either for it or for its predecessors, the chalumeaux of various sizes.

The bassoon was, for Handel, part of the standard bassi, just as the oboe was a standard treble instrument and it is fair to assume that when the oboes were implied in the treble, the bassoon was implied in the bass. Both, of course, were often specified also. For Bach, as always, one would assume that he would have asked for it when he wanted it, but there is a number of contexts where there are oboes of various sizes on top and in the middle, and where a bassoon rather than a string bass sound would seem appropriate. This is another of those grey areas to which the bass seems particularly prone and where, personally, I'd stick my neck out and use what I suspect might be right even though there is nothing on paper to say so. There are plenty of examples of possible bassoon bassi if you look through any scores of this period. So far as definite bassoon parts are concerned, if you look at the two bassoon parts in the 'Quoniam' of the *B minor Mass* you will see that the players were at least as good as any modern player —

bear in mind that they only had three, or maybe four, keys on the instrument.

The gap between the oboe and the bass, whether bassoon or not, was filled in Germany by two larger sizes of oboe, the alto in A, a minor 3rd below the treble, the oboe d'amore, and the tenor in F, the former usually as a solo line instead of the treble, the tenors often with the treble and the bassoon. These sizes seem not to have been available in England (the English tenor oboe, the vox humana, certainly existed by then, but seldom if ever appears in scores and may have been a military band instrument), and only the tenor in France. The d'amore was particularly suited to accompanying the soprano voice, judging from Bach's use of it, and there are no doubts about what it looked and sounded like. Bear in mind that its range was then more different from the ordinary oboe than today — the oboe's lowest note was then C, so that there was a minor third difference in range, not a semitone, as there is today with oboes going down to B♭.

The tenors are much more of a problem. There are three surviving types of tenor oboe, all a fifth below the normal instrument with a lowest note of F below middle C, and there are only two names to share between them. One looked like an enlarged oboe; one was similar, but like the oboe d'amore it had a bulb bell. The third had a widely-flaring bell, sometimes of metal and sometimes of wood. The two names are taille and oboe da caccia. It is nowadays assumed that the caccia was the one with the flared bell, similar to that of the corno da caccia, the French horn of the

period, but I stress that that similarity is the only reason for that assumption — no instruments survive with an eighteenth century label attached saying 'This is an oboe da caccia, signed JSB' — there is no concrete evidence whatsoever. My own guess is that this assumption is in fact correct and that taille was an indefinite term meaning any tenor oboe available, but I stress again that this is only a guess.

Of these woodwind instruments, the traverso was by now usually made in four pieces, the one-piece middle joint of the Hotteterre flute being divided between the two hands. This was probably partly for portability, partly to allow more accurate reaming (shaping the interior) of the bore, leading to better intonation, but chiefly so that one could have a set of alternative upper body joints. There was no standard pitch in those days; each town might well have a different standard, and even within the town it was usual for the church to be at one pitch and chamber or orchestral music to be at another, and sometimes the opera at a third. Each upper body joint or corp de rechange was a different length and thus produced a different pitch. In addition, Quantz suggests in his book *On Playing the Flute* (which is available in a good English translation under that title) that, because playing softly produces a flatter pitch and playing loudly produces a sharper one, if one was playing a nice gentle slow movement, one should use a shorter joint to sharpen the flute so that when one blew gently one would flatten it to the right pitch, and when playing a lively allegro, one should use a longer joint so that when

blowing loudly one would bring it back up to pitch. We have a number of flutes in the Bate Collection of this period by a wide range of makers.

We also have an unrivalled collection of oboes of this period, Dutch, French and English, from about 1700 to 1750. They differ to some extent through this period, partly by national type, but all still have the three keys of the earlier period. We don't have an oboe da caccia (there isn't one in this country, and I think only two or three survive in all), but we do have a bulb-bell tenor, and also a copy of a straight tenor with an ordinary bell. We also have a rather late vox humana, the English tenor. We have only one bassoon as early as this, by an otherwise unknown Belgian or French maker, Dondeine, but we do also have a copy of the sole surviving English baroque contrabassoon, that by Stanesby junior, which is now in Dublin, but which we know, because its provenance is fully traced, was used in the first performance of the *Music for the Royal Fireworks*.

The brass instruments were the horns and the trumpets, of which the latter were by far the more important with, as we saw last week, already a long tradition of virtuoso performance. At this period they were normally in D, and therefore any works in which the composer wanted to use trumpets were, perforce, written in that key or a closely related one — hence the choice of B minor for Bach's *Mass*. Horns in the earlier part of this period were a bit rough — we shall see more detail on this next week — but they improved considerably in the 1730s. Both horns and

trumpets could only play the partials of the harmonic series, a common chord in the tonic key from middle C up, plus in the next octave up the supertonic, the subdominant, the submediant and the leading note. Of these the problem pitches were the submediant, for the top A is woefully flat, and much more seriously the written F, the subdominant, for the 11th partial is exactly halfway between F and F♯. Players had either to lip it up to F♯ or down to F natural, for composers wrote whichever they required. That this was not always successfully accomplished is well known, for there are many complaints about out-of-tune brass playing from Burney and other authors. However, I refuse to believe that composers wrote notes knowing that they would be played out of tune until the day in 1815 when valves were to be invented; composers aren't like that. I think that we can assume that just as today, there were good players and bad players, and just as you would not judge twentieth-century orchestral playing by the band on Wigan Pier, so you should not judge it by some of the provincial bands that Burney complained about. If all the players were like that, we would not have the superb horn and trumpet parts that we have.

Another point to note is that in the clarino register, from the 8th partial (an octave above middle C) upwards, the trumpet was usually quite a quiet instrument, getting quieter as it got higher. Thus there were none of the balance problems that we have today, when trumpet parts are played on piccolo valve cornets. To a lesser degree, the same is true of the horns; they were louder than trumpets in the same written register because they were twice

the tube-length, but then modern double horns are so close to saxhorns in sound that they are far too loud today.

Finally the timpani, which were regarded then as bass trumpets, playing tonic and dominant. With smaller diameter and depth than modern instruments, thicker skins than today and played with wooden sticks, they produced a sharp, clear rhythm with little of the woolly boom of the modern timpani. They could point a bass line in a way that is totally lost today except in the 'early music' orchestras.

So, again, what of the instruments? Here we are sadly lacking. While we have one of the very few Stuart trumpets surviving, we have nothing from the Baroque. Nor do we have any ordinary baroque timpani, though I have used the pair of Ward patent drums by MacConnell in many baroque performances; they are the right size and more or less the right shape, but of course the wrong tuning system. What we do have is the only known surviving pair of baroque double drums, tucked half under the plucked string case (there is one of a pair surviving in Leningrad, but not the other, and I know of no other examples). These are the sort of drums that Handel used to indent to the Royal Armouries to borrow for special occasions, twice the normal diameter but little more than the normal depth. They have a superb tone quality and clarity in baroque music (I played them for the Tercentenary *Messiah* in the Sheldonian on Handel's birthday, and they sounded wonderful in there, and we have used them with the MacConnells and the smallish pair by Köhler also on display for the *Royal Fire-*

works, which we know was originally played with two pairs of ordinary drums and one pair of double drums). We have two horns of the right period, the Christian Bennett and the Haas.

I've spent all this time talking about Bach and Handel, Germany and England in other words, and never mentioned Rameau and Vivaldi, and thus France and Italy. There was not a lot of difference, save that those two were much more enterprising in their selection of instruments. Rameau continued the style of the court ballets by using instruments such as musettes, the small court bagpipe, vielles à roue, the hurdy-gurdy, tambourin, the deep Provençal tabor which Bizet uses in *L'Arlésienne* and other less common instruments, especially in the many dances in his operas and of course his ballets. Vivaldi, who was writing for a girls' school, obviously had far more talent at his disposal than Purcell had had in the girls' school for which he wrote *Dido and Æneas*. Vivaldi certainly used chalumeaux, the ancestors of the clarinet, piccolos, and many other instruments. However, for both composers, the basis of the orchestra was the same as what we have been discussing: the strings, the continuo, and oboes, bassoons, trumpets with timpani, and horns, with less often the traversi and recorders, and plus, as always, the continuo. The one other area where France differed was in the use of the viola da gamba, which was a highly important solo instrument, whereas it was dead in Italy and Britain and only seldom used in Germany, where it turns up occasionally as an obbligato soloist as in the Bach Passions. There were other oddities in Germany, too, the tromba tirarsi or

slide trumpet, which Bach uses in chorales, a survivor from the later Middle Ages, and a couple which we have still never been able to identify, the corno da tirarsi (how do you fit a slide into a baroque horn?) and the lituus, which can hardly have been the Roman army trumpet. But these are of comparatively little importance until you are actually performing one of the cantatas in which they appear.

The main instruments that we have described are what was available in the baroque, but the extent to which it was used was a matter of economics, as always, and of guild (the trade unions of the day) and other restrictions. In Germany, in particular, trumpets and drums were subject to restrictions and could only be used under certain circumstances. Economics was probably a greater restraint, and since so much of the music was written for specific bands, whether municipal, ecclesiastical, theatrical, or private, the orchestration was almost always limited to what was available, rather than to what a composer might have liked to use. We shall spend a whole session next week on a set of works written for a specific private band, that of the Elector of Brandenburg, for Bach's set of concertos for that band has much to tell us.

— 3 —

The Brandenburg Concertos

I want, as it were, to 'waste' a week on these concertos partly because they are a fascinating object of study in their own right, but chiefly because their scoring is so specific that I am certain that they must have been conceived for a band whose constituents and whose abilities were known, and which we can still assess today. As we shall see, there is no way that Bach can have simply parcelled up a stock of scores out of the bottom drawer, and there is no way that they could have been written at random for whatever may have turned up. Nor can it be that their musical form is random. Each one is different, and, with a composer of Bach's character, these differences must be deliberate.

First their titles, and these also show differences:

Six Concerts Avec plusieurs Instruments

Concerto 1mo á 2 Corni di Caccia, 3 Hautboe e Baſsono, Violino Piccolo concertato — 2 Violini, una Viola è Violoncello, col Baſso Continuo

Concerto 2do á i Tromba i Fiauto i Hautbois i Violino, concertati, è 2 Violini, 1 Viola è Violone in Ripieno col Violoncello è Baſso per il Cembalo.

Concerto 3^{zo} á tre Violini, tre Viole, è tre Violoncelli, col Baſso per il Cembalo.

Concerto 4to á Violino Principale, due Fiauti d'Echo, due Violini, una Viola è Violone in Ripieno, Violoncello è Continuo.

Concerto 5to á une Traverſiere, une Violino principale, une Violino é una Viola in ripieno, Violoncello, Violone è Cembalo concertato.

Concerto 6to á due Viole da Braccio, due Viole da Gamba, Violoncello, Violone è Cembalo.

These are exactly as they are in the autograph score.

This list has a number of implications:

in 1: Only the violino piccolo is concertato, and this is the only mention of Basso Continuo in the whole set, though no.4 has Continuo without the word Basso. Note also the curious plural of the oboes, which is neither French, as in the next concerto, nor Italian.

In 2: Here we have four concertati instruments, the trumpet, recorder, oboe, and violin. While there is a violone in the ripieno, a great bass viol (note well that there is no cello), there are also a cello and a bass with the (or should it be for the) cembalo, which are separate from the ripieno.

In 4: Only the violin is Principale; the rest are ripieno, and here there is a cello with the continuo without a bass; the violone is again part of the ripieno, again without cello.

In no.1 and no.4 we have a Continuo, Basso Continuo in 1, just Continuo in 4. In 2, 3 and 6 we have Cembalo instead, and

in 5 we have Cembalo Concertato (who is figured in the tuttis and so should therefore count with 2, 3 & 6). Is there a different expectation between Cembalo and Continuo? Is there perhaps an implication of a different instrument, maybe an organ in no.1 and no.4?

Only in 2 and 3 do we have a Basso. In no.1, the title has Basso Continuo but the first page of score has Continuo è Violino grosso on the bottom line. Is Violino grosso, the double bass violin, the instrument that we call a double bass today, the same as Basso, and did it differ from Violone, the great bass viol? The great bass violin had three, four, or perhaps five strings (Praetorius shows it with five, but that's in 1619 a full century earlier; what little we know of early 18th century basses suggest that four strings was normal. The great bass viol, on the other hand, like all other viols normally had six strings. The violone was, so far as we know, tuned in fourths with a third in the middle like all other viols. The double bass seems to have been tuned in fifths like any other violin; we don't really know when the modern practice of tuning in fourths to suit better the span of the human hand came in, but it may have already been in. I have a strong suspicion that double basses were tuned to what the player preferred.

Bach is quite specific on numbers — he is specifying the number of players, not the number of parts. His grammar is strict; he writes una, not uno, for viola; only in no.5 does he go adrift, seduced by his French traversiere (the grave accented -ière is later than his period), he writes une Violino twice, correcting himself

when he reaches the viola. We can assume from this that when he writes violoncello, he means it, and this is confirmed in no.3, where he does use the plural. So all parts, solo and ripieno, are for a single player. Harking back to our first session, this rules them out as orchestral works by my own definition, but I hope that you will allow me my own interest in these works.

The structure is also worth noting:

No.1: 1st movement is a ¢ written out in full

2nd movement is a $\frac{3}{4}$ Adagio, also written out in full

3rd is a $\frac{6}{8}$ Allegro Da Capo

4th is a $\frac{3}{4}$ Menuet (note the French spelling) in the usual AABB form; a 3 (in crotchets but not specifying $\frac{3}{4}$) Trio in the same form for 2 oboes and bassoons only; Menuet repeated; a $\frac{3}{8}$ Poloinesse (again French) for strings only (without the violino piccolo) in the same form; Menuet repeated; a $\frac{2}{4}$ Trio for 2 horns and tutti (all three) oboes in the same form; Menuet repeated.

No.2: 1st movement is a ¢ written out in full

2nd movement is a $\frac{3}{4}$ Andante, also written out in full

3rd movement is a $\frac{2}{4}$ Allegro assai, also written out in full.

No.3: 1st movement is a ¢ written out in full

2nd movement is a C Adagio, consisting only of two minims; a half close, with no indication of anything else

3rd movement is $\frac{12}{8}$ Allegro, written out in two halves, both halves repeated.

No.4: 1st movement is a $\frac{3}{8}$ Allegro Dal Segno with a longish first section and a very long middle section.

2nd movement is a $\frac{3}{4}$ Andante, written out in full, ending on the same half close as the second movement of no.3

3rd movement is a $\mathbb{C}$ Presto in fugal style.

No.5: 1st movement is a $\mathbb{C}$ Allegro Da Capo (the only $\mathbb{C}$ first movement with a tempo indication)

2nd movement is a $\mathbf{C}$ Affetuoso for the three soloists only, written out in full

3rd movement is a $\frac{2}{4}$ Allegro Dal Segno with the segno on the first barline.

No.6: 1st movement is a $\mathbb{C}$ written out in full

2nd movement is a $\frac{3}{2}$ Adagio ma non tanto, also written out in full

3rd movement is a $\frac{12}{8}$ Allegro Da Capo with a very long first section and only 18 bars for a middle section.

Much of this is hidden from you in all printed editions; all, even the old and new collected editions, hide the da capos. Not even Bärenreiter shows the plain 3 for the first Trio of no.1. Only by looking at the autograph can you see that each one has a different form. Also hidden in the printed editions is the language; it is arguable here also that movements titled in French, such as the multiplex Finale of no.1, should be played in French style. It is arguable also that the affetuoso of no.5 should be ornamented in Italian style. I am not saying either yes or no on these two points, though I have my own opinion; what I am saying is that it

is arguable and that anybody who is performing the Brandenburgs should at least take it into consideration and argue it out.

Now to detail on the instrumentation, which also differs in each concerto:

No.3 is the most conventional — there are three each of normal strings, three violins, three violas, and three cellos, plus basso and cembalo. Continuo figures exist for the first movement in Cantata 174. The only problem is the slow movement. Tovey suggested many years ago, in his *Essays in Musical Analysis*, that the two chords are the end of an improvisation, though one wonders if so why Bach did not write it out as he did in No.4, where we have the same ending to the slow movement. Again, perhaps this was for the sake of different form. If it is an improvisation, and surely it is, we have the vexing question of who played it? In this concerto alone, no one player should be more equal than the others; all nine are on equal terms even if, as is inevitable, the top part in each group of three is rather more difficult than the other two. There is a slow movement of a violin and clavier sonata, which also ends on the same close in the same key (BWV 1019) which can be scored out for violin, viola and cello, though it does not sound like an improvisation, and more seriously it's difficult to construct a reasonable sounding viola part. Tovey suggests a different movement, which needs to be transposed to fit since it's in a different key. To my mind violin alone is inappropriate, for the reasons already given, and since there is no other evidence for any solistic tendencies by the cembalo player in this concerto, a

harpsichord cadenza seems to me to be wholly unsuitable. But without doubt something needs to be done; there was a tradition with people like Boyd Neel, for example, in which these two notes were solemnly played exactly as they are written, as though this was all that Bach wanted, but this horrible practice, thank heavens, has now died out, I hope everywhere.

The nine main instruments themselves, of course, are simply the ordinary strings of the period, and they were very clearly more than merely competent players, especially the upper two violas; even today those parts are regarded as taxing. The basso I would take to be a normal double bass violin, since it says basso rather than violone, presumably, but by no means certainly, sounding an octave below the written notes.

No.6 is unusual in its request for two viole da gamba. These were all-but extinct by Bach's time, though there is a big solo in the John Passion and some solo music, and although there were players around such as Abel even in the Bach sons' generation. Certainly they were fairly unusual instruments for any orchestral context by this time, though, as here, they seem to have continued as chamber music instruments. They were obviously fairly dud players at Brandenburg, and this may have been normal by that time which may be why they so seldom turn up; they have few excitements in this concerto and they don't play at all in the slow movement.

It is generally assumed, probably correctly, that viola da braccio equals ordinary viola, the da braccio being there to contrast

with the da gamba. They were very obviously topnotch players at Brandenburg; by no means the superannuated violinists that Leopold Mozart refers to; the parts in both no.3 and no.6 are lethally high. They must also have been good musicians, for no.6 has more traps than any of the others for the unwary, as I discovered the first time that I conducted it; in all three movements it is very easy indeed to get out of kilter.

It is worth noting, too, that this is the only concerto in which all parts seem to be on an equal footing. In no.1 and no.2 there are concertati parts; in no.4 and no.5 there are principale parts, and in no.5 a concertato as well; in no.3, the nine upper strings are equal, but the bottom is 'col basso per il cembalo'. Only in no.6 is there a straight list of two violas, two gambas, cello, violone, and cembalo. And, as mentioned already, it is violone, not double bass.

No.5 is fairly conventional, save that there is only one violino ripieno, and there clearly were three violinists available (in nos.1, 2, and 4 there is one violin soloist and two ripieno, and in no.3 there are three violins). The flute is specified as transverse, as is always the case when a transverse flute rather than a recorder is required. The cembalo is the star (the violino is Principale, whereas the cembalo is Concertato) and there is nothing very taxing for either violin or traversa. One wonders whether Bach hoped for an invitation to come and play it, but wrote it out in case he wasn't, (which, incidentally, is a strong argument against a harpsichord solo cadenza in no.3). This is the only concerto in which the bass

is figured in all the tuttis, and one wonders why this should be and just what it implies; was there a continuo harpsichord there as well? But if so, why aren't the basses figured in the other concertos, especially in no.1 and no.4, the only ones where the word continuo is used. Or was it just to make certain that the harpsichordist didn't say to himself, "I'm the soloist today so I needn't bother with all these damned chords"? That does have a ring of probability about it, and perhaps it was the reason.

No.2 includes a Fiauto, in other words a recorder, in French G clef (G on the bottom line), with oboe, violin and trumpet, all four listed as concertati, and in Bach's day there was no problem of balance. A 6′ trumpet in F playing up to the 18th partial sounded very different from a 2′3″ valved cornet in B♭ alto playing a tone above the 6th partial. Trumpets could play loudly (for instance the Sanctus in the *B minor Mass*) but they were also chamber music instruments with a very large repertoire. The only puzzle is what sort of trumpet was it, for there is very little other evidence for a trumpet in F in this period, and indeed it doesn't reappear as a trumpet key till halfway through Beethoven's career. There have been suggestions that it was a small coiled trumpet, or tromba da caccia, the type of instrument that Gottfried Reicha is holding in the well-known portrait of him (we know that he played for Bach and that he was a Stadtpfeiffer, or town musician, and not a member of the Trumpet Guild). If it were, one might have expected Bach to write tromba da caccia, instead of plain tromba, though of course if there were no normal trumpets in F, and if,

which we don't know, trombe da caccia only came in F, that would be hardly necessary; if this were so, writing tromba in the key of F would have been indication enough.

The oboe also appears in no.1, but this is the only appearance of the ordinary recorder and of the trumpet. It is also very important to note that the ripieno consists of two violins, viola and violone, with cello and double bass for or with the harpsichord. If the violone was a sixteen-foot instrument, there is no eight-foot in the ripieno squad, which seems so improbable that it suggests that the violone was in fact an eight-foot instrument, but that would then mean that there was no sixteen-foot bass in concertos 5 and 6. I find this whole bass problem pretty well insoluble.

No.1 shows the difference between trumpets and horns in 1721 (and just possibly only at Brandenburg). While the trumpet in no.2 is very much one of the chamber group of the concertino, the horns here are clearly off to one side, belting out their hunting calls (there are traditional hunting calls in the music here). When they do play as soloists (in the last Trio), they have to be balanced by all three oboes in unison. This contrasts very much with Bach's later writing for horn, for example in the 'Quoniam' of the *B minor Mass* in the 1730s. It is quite clear that German horn playing was very competent but somewhat raucous in 1721 and very much more sophisticated and 'musical' a decade later. The horns were played, of course, with the hand out of the bell, tuning the out-of-tune partials just with the lip, exactly as on the trumpet. The Bennett and the Haas horns in the Bate are typical

example of corni da caccia of this period, hard in sound, narrow in bore, and made of one long coil of tubing. This contrast between the horn and the trumpet parts of these two concertos also shows up for the nonsense that it is of the various recent attempts to show that the horn parts were really for trumpets; both are wholly in the tradition of their time and place.

This is the only concerto with a bassoon part.

The violino piccolo part, the only concertato part, is written as a transposing instrument in E♭ on the normal treble clef, a minor third lower than it will sound. The player plays what is written, and because his violin is tuned a minor third higher than usual, what comes out fits the music. The violino piccolo was what we would call today a 1/2 or 1/4 size violin, probably a half-size in this case, but instead of being fitted with thicker strings and tuned to normal violin pitches, as it would be for a child, it was fitted with strings of normal thickness, which therefore sounded higher when at the usual tension.

We have already dealt with the form, but it is worth repeating that this is the only concerto of the set with a finale in the form of a French suite of dances, including a Polonaise over a century before Chopin started writing them.

No.4 contains the most difficult problem regarding the instruments. The violino principale was a normal violin, though with by far the most difficult and virtuostic part of all the six concertos. The part does not even begin to compare with those in no.1 and no.5, so much so that one wonders whether it was written for a

different person with much greater skills. The ripieno is the same band as in no.2, the two violins, viola and violone, with the same question of whether the violone was eight- or sixteen-foot pitch, but unlike no.2, there is only a cello with the harpsichord unless, of course, since the word here is not cembalo but continuo, one assumes an automatic cello plus bass plus harpsichord for the continuo, in which case we have a spare cello who is neither ripieno nor continuo.

The problem in this concerto is with the Fiauti. Their parts are written on the French G clef (G on the bottom line), as was usual for recorders at this period, so that is no problem. The problem lies in what were they? What was a Fiauto d'Echo? A passage in the slow movement makes it quite obvious that it was not an ordinary recorder. Look at bars 1 & 2 and then at bars 3 & 4 — the same passage first forte and then piano — ie an echo effect. Now look at the same bars in the slow movement of the F major concerto for Cembalo with two flauti and strings. These are ordinary flauti, and clearly they could not echo, so Bach rewrote the music to put the echoes on the cembalo, which was presumably a double-manual instrument which, because the player could change from a full registration on the lower manual to a single eight-foot stop on the upper, could cope with something that ordinary recorders could not reach. There must have been a pair of instruments at Brandenburg of a type that was not available to Bach eleven or twelve years later in Leipzig.

So what was the Fiauto d'Echo? Unfortunately we don't know. The likeliest hypothesis, for which I must emphasise there is no evidence, is that they were recorders with some equivalent of the Dolmetsch chin-key, a small hole near the mouth of the instrument which, when it is opened, sharpens the pitch so that one blows more gently to bring it down again, and thus echoes. This hypothesis was advanced by Cary Karp in Stockholm in response to an article of mine on this question; it was advanced on the strength of an instrument in the Stockholm collection that had such a key, for the thumb, but which was not playable so that it could only be a hypothesis. Unfortunately there was an identical instrument in the Rosenbaum Collection in Scarsdale New York [now in Japan] which does work, and that is not what that key does. So the question is still wide open, and all that we can do is repeat what I said earlier, that there were two special recorders in Brandenburg that could do something that ordinary recorders cannot do.

No.4 is thus the most frustrating of all the Brandenburgs. Here we have the six most popular works that Bach ever wrote and we have to say that in this one of them we have no idea at all of what instruments it was written for.

Musicology is full of such puzzles, even if we do not always admit it so openly in public.

— 4 —

The Great Change

The second half of the 18th century is an important period in the history of the orchestra, and of instruments in general, because it is one in which there was a total change of orchestral sonorities. This is something that seems to happen in the second half of most centuries (why, one wonders, the second half?): in the 1660s and 70s we have already seen the change from the Renaissance instrumentarium to that of the Baroque, the change from Monteverdi's orchestra to Lulli's and Purcell's; in the mid-nineteenth century we shall meet the work of Adolphe Sax and Theobald Boehm which led to the Wagnerian orchestra and that of Mahler, Strauss, and the other composers of the late nineteenth century; in our own time, anyone of my age has seen, or rather has heard, every orchestral instrument change in sonority and seen and heard also the introduction of a whole new class of instruments, those of the electronic revolution. In fact, let us anticipate a bit and discuss some of these modern changes and their effects before we go back to those of the eighteenth century.

When I entered the musical profession in 1950, every flautist except Geoffrey Gilbert was playing on a wooden flute. Geoff Gilbert introduced the tin flute from France, and because he sent

all his pupils to Paris for finishing, its use gradually spread. We called it a tin flute, but it was really silver of course, or gold for the better instruments (silver with a gold head at a pinch) and, because the denser the metal the greater the volume of sound, Geoff Gilbert had one made of platinum; it wasn't as successful as he'd hoped and was far too heavy, so he had to melt it down again. The tin flute has a much louder sound than the wooden one, and a much harder sound as well; a 'good' flautist can sound surprisingly like a trumpet, and if you want evidence of this, listen to Jimmy Galway, and then think what his sound does to orchestral balance even in something written for the tin flute like *L'Après-Midi d'une Faune* or *La Mer*. The old wooden flute, played by people like Gerry Jackson, was a very different sound; quieter, less piercing in fortissimos, nothing like as sweet as the eighteenth-century boxwood but not as hard as the silver.

The oboe has changed comparatively little, for we have been playing on French oboes since the early nineteenth century, and Triébert's thumb-plate system was established before the end of that century and is still in use today. The later Conservatoire system certainly affected the fingering, but it didn't materially affect the sound.

The Boehm clarinet was already in fairly widespread use in the orchestral profession even though the older Albert or simple system was still used in the military band. But in those days the clarinet players produced a different sound from that which Jack Brymer encouraged and fostered; Jack Thurston, whose widow

and pupil Thea King often plays here with the Allegri Quartet and who still plays in much that style, had a narrow and precise sound (it's very difficult to describe sounds in words), whereas Jack Brymer's was much wider and, woollier isn't the word I want, but it is a less focused sound today.

The bassoon changed in the late 1930s. The old French bassoon, light and full of character, gave way to the German Heckel system, a much louder, more even, but much duller sound. Through the 1950s there were still a few French players around, Eddie Wilson, Joe Castaldini and others, but they are all gone now. The Royal Phil had Gwydion Brooke on a German instrument and Eddie Wilson playing second on a French, and they blended together surprisingly well, but on the whole the two didn't mix. The French instrument was rather better at high notes, but the German was much safer all round, which was another reason for its adoption.

There were still a few French piston-valve horn players, too, and more important, almost all the horn players had started on the French instrument and so had that sound in their ears even when they played the wider-bore rotary-valve German horn; one of the few left till recently was Alan Civil; everyone else sounds more and more like a young euphonium to me. Listen to Alan's recordings of Mozart concertos, then listen to Dennis Brain (his first recordings were on a French instrument, his second set on a German), and then, to hear how horn tone has deteriorated, listen to Ifor James or Barry Tuckwell. A lot of the trouble is that the

instrument has shortened, from a 12′ tube for the old F horn, to a 9′ tube for the B♭, a 6′ tube for the F alto, and now sometimes a 4′6″ tube for the B♭ altissimo, the same length and much the same tone quality as a flügelhorn. They are still playing the same notes, of course, but a 6th partial on a 4′6″ tube has a very different tone quality, and cuts through the rest of the orchestra very differently, from a 16th partial on a 12′ tube. Composers have, at all periods, taken advantage of these differences of tone quality; Haydn choosing C alto in a number of his symphonies was deliberately looking for a bright horn tone that would cut through; Berlioz choosing C basso for 'La Chasse Royale' in *The Trojans* was deliberately choosing a sound that would give the impression of the hunt in the distance in the woods; playing the Haydn on a 4′6″ tube, or even a 6′ tube instead of an 8′ sounds harsher than he intended because the bore is wider today; playing the Berlioz on a 9′ instead of a 16′ tube sounds like nothing on earth.

Both trumpets and trombones have got wider in bore, like the horns, and the trumpets are much harsher than they used to be (if you can find a copy, listen to George Eskdale's silvery sound in his recording of the Haydn concerto and compare it with John Wilbraham; oddly the French have got thinner and more effeminate in sound, as Maurice André's recordings will show). Trombones are far less precise than they used to be; the old French-bore, the pea-shooter as we called it, had a bite, almost a sting, which is completely missing on the wide-bore American instruments we use today. If any of Elgar's own performances are still

around, compare them with modern ones. Of course, the chap who suffers most from this is Gustav Holst, a trombonist himself, who wrote beautiful parts for his own instrument, not just in the *Hymn of Jesus*, but throughout his music. One trombone has vanished altogether; once upon a time there was a bass trombone, in Germany in F and in this country in G, a tone higher; nowadays all are tenors with a plug in the back-bow adding extra tubing for the bass notes. Whatever a player may tell you, a B♭ instrument with extra tubing, whatever they have done to the bore, does not sound like an F or a G instrument. The alto had died out already by my time, just like the C clarinet, which has a quite different tone colour from the B♭, and both have been making something of a come-back in the last few years.

Maybe you think that I am talking too much about tone colour, but transfer this for a moment to painting; a painter has a certain palette, with colours which he judges and juggles to balance his painting, this blue in the sky, that in a coat or a dress, this green at the edges of leaves, and that green further back in the tree, and another green for the grass. Now change those blues and greens, darkening one, harshening another, making another stand out more. The result is a different painting, and the result of what I'm talking about is a different sound and thus a different musical concept.

Strings have changed even more. Nowadays everyone uses steel-cored strings with a very hard sound. When I began, the only steel string was the E, and there were plenty of people still

around who remembered when any player interested in tone quality, Kreisler for example, used a gut E; maybe it broke sometimes in the middle of a concerto, but it was worth the risk of that for the sake of the beautiful quality of the sound. The steel E is much harsher, with something of a whine, and so too the steel on the other strings is harsher than the silver-covered gut or silk. Those players who use covered nylon are at least part-way better in tone than those who use steel. Bass players now have often fitted a fifth string so as to get down to the low C; you need this for Mahler, for instance, who demands it specifically, and some other later composers, but it's arguable how much you want it pre-Beethoven (he was the first, as far as I know, to write separate lines for cello and bass, changing the bass lines when the cello went below E; in other words, he was the first to control where the player broke the line and jumped up the octave; earlier composers left it to the players to sort it out. Now you get some bass players playing the cello line ('How much Beethoven would have preferred it') instead of the bass line, and one wonders just how much would Beethoven have preferred a constant 16′ pitch; maybe he would, but he isn't here to ask, and he balanced his orchestral palette without it. String mutes have changed, too, and are rather lighter than they used to be and so rather less effective.

Pianos have changed, too. In the last twenty years the Steinway has got far harder in tone colour. The hammers have got harder, which is part of it, but more seriously the string tension has grown greater, and the result of this is that the over-

tone spectrum has changed, for the overtones of strings are harmonic, whereas those of bars, which is what too tight a string becomes, are inharmonic. As a result, if you listen carefully to the sound of a modern piano, you can hear a jangle of out-of-tune overtones which clash with other notes of the chord being played. This makes the sound even worse than equal temperament makes it; the third was a dissonance in the Middle Ages because the Pythagorean third was a quarter of a semitone too sharp; the equal tempered third isn't as bad as that, but it's still about a sixth of a semitone sharp.

Percussion has changed too. Once timpani had skins; now they have polythene, a very thin sound which rattles badly (listen to the Berlin Phil under Karajan; the timpanist sometimes sounds as though he fired a revolver). Cymbals have got a lot thinner in sound, now that they are made in Boston instead of Istanbul. If you look at a modern Zildjian (which is still the best make), it says on it 'Genuine Turkish, Made in U.S.A.', and make what you can of that; it's a bit like 'Antonio Stradivarius fecit, Made in Czechoslovakia', which is what it says in one of my violins. They used to be able to make triangles which had no pitch in the sound, but they seem to have lost the art, and nowadays any drummer carries at least two, so that when one produces a nasty clash in the Liszt E♭ Piano Concerto he can see if another will improve things. Xylophones are now sometimes plastic, instead of wood, glockenspiels are aluminium alloys instead of steel, and so on, and it all makes a difference to the sound, to the amount of sound,

to the orchestral palette, and to the balance of the parts within the orchestra, and anyway it's time we got back to the eighteenth century.

Starting again at the top of the page of a modern score, with the woodwind, though eighteenth-century scores were very differently laid out; they usually had trumpets and timps at the top, then violins and violas, and then the woodwind where voices would normally be, immediately above the bass. The voices were there so that the continuo player could keep an eye on them in case help was needed; presumably the woodwind were there for the same reason. The Konzertmeister would look after the strings, and the continuo player look after the wind; trumpets and drums could presumably look after themselves!

The recorder finally died out. This was because music was becoming expressive, with crescendos and diminuendos, and the way you achieve this on a woodwind instrument is by blowing harder or more gently. When you blow harder on a recorder, the pitch goes sharp, and when you blow more gently, the pitch goes flat, and there is very little you can do about it, unless of course you have one of the Echo recorders we were talking about last week. The same thing happens on a transverse flute, but because that has an open embouchure (the blowing hole), you can roll the embouchure towards the lip and so covering it and reducing the area of open hole and thus flattening the pitch by the same amount as you are sharpening by blowing harder. Rolling it away to sharpen it does the same job when you blow more gently and

thus flatter. Not that all players were so successful in this, and the fact that most composers wrote for one flute (Beethoven used only one in his first orchestral works) suggests that the old joke of 'what sounds worse than one flute — two flutes' may often have been true. Nevertheless, where pre-1750 the word 'flute' in a score meant recorder, after that date it normally meant the transverse instrument. We were, as so often, old-fashioned in this country, and the term German flute lasted well into the nineteenth century to mean the transverse flute, though common flute, for recorder, was by then pretty rare.

The flute still usually had only one key, so that all notes other than those of D major had to be played by cross-fingering, closing holes below the lowest open hole, which tends to muffle the sound a bit, and muffles it more when, to get the F♮ low enough to be tolerable, the player had to roll the embouchure in to flatten the note. It was somewhere in the third quarter of the eighteenth century that the four-key flute came into use to avoid this, adding to the D♯ key a key for F♯, another for G♯ or A♭, and the fourth for B♭. Just when the range was extended to middle C, we don't know for sure. Certainly by Mozart's time, because he writes that note, and people had certainly tried in Quantz's time because, in his *Treatise on Playing the Flute*, published in 1752, he says what a lousy sound it makes and how it ruins the tone, and Caleb Gedney said that his master, Stanesby junior, who died in 1754, made flutes with those extra keys.

Flutes were still being made with the extra body joints, the corps de rechange, I talked about a fortnight ago, for tuning purposes, and the tuning slide, which made these unnecessary was patented by Richard Potter in London 1785, but there is good reason to believe that it was earlier than that elsewhere. The reason for these extra body joints is that if you pull out the joints of a wooden flute, you get a gap in the bore the thickness of the wood and the length of the amount that you pull it out, and caverns in the bore play hell with the tuning. Quantz suggests that if you need to pull the joints out, you should put little rings into the socket to fill up the gap. What also came in in the mid-century was the screw cork. If one changes the length of the flute by swapping joints or pulling out tuning slides, one should also change the distance between the cork and the embouchure. This can be done by poking a stick up it from either end, but this is a nuisance and not very precise. Having a screw in the cork so that it can be pulled out or pushed in by turning the cap is a much better device, much more precise and much quicker.

The oboe narrowed in both bore and reed, and as result in sound also. Where Handel could use as many oboes as violins, Bach's sons used only one to a part. The soft broad sound of the old oboe became something much nearer to what we hear today, quite close to the oboes played still in Vienna and which you can hear with the Vienna Phil. The late Baroque/early Classical woodwind instruments and horns have their nearest modern counterparts in present-day Vienna; they are well mechanised,

of course, and the horns are valved, but the bores and the tone colours are nearer there than anywhere else except, obviously, in the early music bands. The oboe is much better at cross-fingering than the flute, and so extra keys were not felt necessary until 1800 or even later. In fact, the oboe lost a key at this period because people settled on playing with the left hand above the right, and therefore the left-hand E♭ key was no longer necessary. Strictly the forked touch for the C key wasn't necessary either, but it looks much nicer than one with just a curve to the right, so most makers stuck to it.

In the more progressive courts a new instrument took over from the alto and tenor oboes, the d'amore and caccias and so on. This was the clarinet which, because it has a cylindrical bore, sounds at a much lower pitch than you would expect from its length. A flute had then a lowest note of D; a clarinet of much the same bore length had a lowest note an octave lower (come into the Bate and compare the lengths of a flute from the embouchure to the end and a B♭ clarinet). As result, it could cover more than the range of a tenor oboe, whose lowest note was the F a minor third higher, and also play higher than the treble oboe, and do it more easily, too. The clarinet had been around in the previous generation (it was invented around 1700), but it was little used. It was not used much in this period, either, and it doesn't really come into common use until we get to the end of the period we shall be discussing next week, that of Mozart and Haydn.

The bassoon got louder because the bell, which had been built with a choke, a contraction, in the bore, was widened out. It added at least one key, to avoid cross-fingering, so that the four-key bassoon was normal, and there seems to be evidence of the six-key instrument not long after the middle of the century. One thing I didn't mention about the flute was that as well as being able to get louder and softer, it was by nature much louder than the recorder. Another major change was in the social conditions of music making; it was at this period, the second half of the eighteenth century, that public concerts began, with new concert halls, like ours at Holywell, the Gewandhaus in Leipzig, the Concertgebouw in Amsterdam, and so on going up. The change from playing in the Count's music room, where the main function of music only too often was to drown the gossip from your neighbour on the other side, to a large hall where people had paid to come in and wanted to get their money's worth by hearing the music, meant that many instruments had to get louder, something that made more difference to the strings as we shall see shortly, but had an effect on all the other instruments too.

First, though, an instrument that got quieter, the horn. In the early eighteenth century, horns were held out on the shoulder and made a fair old blare. Around 1750, the Bohemian horn player Hampl discovered that if he put his hand in the bell, it not only made the sound quieter and more pleasant, but it allowed him, by moving his hand and stopping the bell to a greater or lesser extent, to produce notes that were not part of the harmonic se-

ries. If you want to hear the difference this makes, you'll have to come to my history of instrument lectures, where I try to demonstrate what I'm talking about, or come into the Bate and ask me to demonstrate it to you; in this series, I'm avoiding all demonstrations because I don't want to distract from the main subject which is the orchestra itself. Basically the reason that the sound got quieter was that the hand-stopped notes were more muffled than the open partials of the harmonic series. This was undesirable, for ideally all notes should sound the same, so players stopped the open notes a little, and the stopped notes rather more, to get as even a sound as possible, with the result that all notes were quieter than they had been, even quieter than just the effect of putting a hand in the bell. The effect of Hampl's discovery was that players could play diatonically, even chromatically, in the middle octave, from middle C up, instead of having to play the very high notes of the Bach and Handel period parts, and at the same time produce a much more pleasant sound which blended well with all the other instruments. The result of this was that the horn became the most important of the brass instruments, usurping the place that the trumpet had held since 1600 and before.

This was just as well, because trumpet playing was going through a rough patch. Another of the social changes of this period was the break-up of the old guild system, where entry into a profession was strictly controlled by limiting it to certain people and insisting on a lengthy apprenticeship. One of the guilds to go in this way was the German trumpet guild, and a result was

the end of the old clarino technique which had allowed players to ascend into the musical stratosphere. The highest notes written as a general rule after about 1750 were the 11th and 12th partials, top F and G on the treble stave, whereas Bach as a matter of course went up to the 20th, the high E in alt, and some people to the 24th, the G on the 4th leger line. The musical result was that the trumpet was restricted to common chords plus supertonic and 4th, and the horn took over the melodic responsibilities.

It was also at about this period that trombones started to come in, though usually only for church music; they had always been around, of course, and why they started to accompany the middle and bass voice parts in church music, I'm not sure; why does one get trombones colla voce in Haydn and Mozart and not in Bach? (Not in Handel is easy; there weren't any in England, which is why Handel only used them for a year or so, when there were players visiting). Maybe we should use them in Bach, even though they are not mentioned; maybe singers got weaker at pitching their parts and needed the support. Maybe this was just one of the results of other instruments getting louder and therefore the singers needing greater support. It doesn't look as though the music was getting much more complex harmonically so that singers needed help in pitching, though that may be the effect of looking backwards, and perhaps the music of the Rococo was more difficult than that of the Baroque to eighteenth-century ears.

So far as the brass instruments were concerned, there was minimal change to the trombones or the trumpets. The bell flare

got a bit sharper, which projects the sound better, though even that change really came earlier in the century. Horns did change quite a lot. The early baroque horns were made in one piece; change key and you changed horn. Within the Baroque period, the separate crooks came in; the tubing was cut, so that you only changed part of it, which worked out a lot cheaper for players. Tuning was still a problem, for to flatten by a little bit you had to put a tuning bit, a short length of tubing, between the mouthpiece and the crook. Much more efficient was the tuning slide, which became available when technology had reached the point of making thin tubing of very precise diameters. The only problem was that this introduced a cylindrical section into the horn, which didn't help the tone, but the man who invents, even today, a conical tuning slide will have his fortune made.

The biggest changes came in the string instruments, but this was towards the end of the eighteenth century. The causes were those that I've already mentioned, the move into the concert hall and the demand of the paying customer to hear the music and the greater volume of sound coming from some of the other instruments. They had to get louder. At first they did this by raising the bridge and thus increasing the string tension. Then they raised the pitch and this increased the string tension even more. The A in 1700 was around 409 in London; by 1730 it was 415; by 1780 420 or 430, by 1800 nearly at modern pitch of 440. 415 was OK and did no harm to the instruments; 430 started to pull them to pieces. All that held the neck to the body was a couple of nails

driven through the neck-block into the neck, and the instruments started to fold up. So one change was to mortice the neck into its block. Another was to tip the neck back, just as a tug-of-war team leans back on the rope. At the same time they lengthened the neck, which of course increased the tension again, but now that the construction was stronger, the thing didn't fall apart any more; all that happened was that the feet of the bridge started to go through the soundboard. So they lengthened and thickened the bass bar, the girder that runs lengthways under the bridge on the G string side, and thickened the soundpost, the pillar that stands under the E string foot of the bridge. The result of all this is that there was precious little left of the work of Stradivarius or any other of the great makers, and the real miracle is that the instruments sound as well as they do after all this was done.

The bow changed, too. The point was deepened so that the hair was further away from the wood, and the band of hair was widened so that there would be more hair in contact with the string. The stick was curved, cambered is the technical term, so that the middle of the stick curved in towards the hair, and this made it much stronger. The musical results were a much stronger tone, a louder sound, and the possibilities of a number of new bowing techniques such as the spiccato, bouncing the bow on the string, and that favourite opening gambit, the coup d'archet, a good crunching chord which would have the effect of stopping the chatter of the audience and proving that the music had really begun.

Keyboards changed, too. The expression that had eliminated the recorder did for the harpsichord, too. You can pluck a string as hard as you like and it will not make a lot of difference to the amount of sound that you produce, but if you hit it, hard or gently, that does make a difference. And so the piano, whose hammers hit the strings, took over from the harpsichord whose quills pluck it. It was the introduction of heavier strings, which became available with the new technologies of the second half of the eighteenth century, that made the piano really practicable, for the sort of strings that had been used on the harpsichord were fine for plucking but not really suitable for hammering. Pianos, too, went through some of the same changes as violins, with string tension rising, due both to these heavier strings and to the rise in pitch, so that while in Mozart's time, the Viennese piano was the sweetest and best, by middle Beethoven, the English were much stronger and would stand up to the pounding of the ever-deafer composer. Later the Viennese regained their supremacy until, in 1821 and outside our immediate period, the French Erard action conquered all. Part of the problem was that mid-eighteenth-century piano makers were cutting corners and simplifying the action, so that it wasn't until quite late in the century that makers were getting back to the very efficient mechanism that Cristofori had invented around 1700. The action of the sort of piano that Johann Christian Bach was playing on in London was far simpler, more primitive, and much less efficient than Cristofori's. To go even further on, it was not until the Americans, in the late 1820s,

invented the iron frame, that the problems of string tension were overcome.

Now none of this happened immediately; it wasn't Christmas Day one day and Boxing Day the next. But it did happen within a lifetime. I used to do a Music Club lecture on this subject, and I called it Musical Instruments in the Lifetime of J.C.Bach. He was born while his father was writing for the old band we considered in the last two weeks, and he died when Mozart was well-established as a composer. I've always wondered how he took these changes, what they sounded like to him, even how much his contemporaries noticed them (I've often wondered how many people have noticed all the changes in the last 37 years that I've been talking about today). He noticed them all right; look at his music if you don't believe me, and look at what he taught Mozart. He wrote for piano, and wrote quite differently for it from his harpsichord music; he wrote for clarinet (which was more than Mozart often did). He took full advantage of the new sonorities and of the new musical balances, and this is why I've, perhaps you think, wasted one of these lectures on the orchestra in history by talking practically the whole time about instruments. You are probably already tired of hearing me say this, but what counts in the orchestra is the sound of the orchestra. No composer builds up pretty patterns on paper; he has a noise in his mental ears, and what he has to get down on paper is what is going to produce that noise when it is produced by the instruments in the concert hall, and this is controlled by the instruments that are available to him.

All the instruments that I've talked about this week are in the Bate Collection. Come and look at them. Come and try them. The only way to discover what the orchestra was like in any period is to hear it, and preferably to play it.

— 5 —

The Classical Period — Mozart & Haydn

With the classical instruments established by the last third or so of the eighteenth century, the orchestra stabilised into the nucleus of the set-up which has lasted to the present day.

The basis was still the strings, now firmly fixed at two violin sections and one each of viola and bass, the latter with possibly equal numbers of cellos and double basses, often rather more bass-heavy than we use today. There was still an implicit continuo, though since it is rarely named in a score, our evidence for this is the occasional example of figures in a bass line, iconographic material (when you see pictures of an orchestra which includes a keyboard instrument, you can usually assume that it was doing something and not just there for the look of the thing), and the best evidence of all, paysheets and lists of personnel. One question that should exercise us is what sort of keyboard was it? Personnel lists quite often say cembalo, but I wonder whether in the 1780s and '90s people were quite as old fashioned as this; there is a normal tendency to want to be with-it and up-to-date, and this would imply a piano and not a harpsichord. Not something that sounds like a Steinway, of course; the fortepiano pre-1800 was a lot closer to the harpsichord in sound than to the mod-

ern piano, and it was usually rather quieter than a harpsichord. There are some double concertos for piano and harpsichord, and the balance problem is that the harpsichord tends to swamp the piano, not the other way round. In fact, that's the best evidence for the fact that when personnel lists say cembalo, perhaps they meant it; the sharper tone quality of a plucked string than a hammered one, and the ability to couple up all the ranks of strings into a tutti of considerable strength may have been a greater advantage than the modernity of the piano and its ability to crescendo and diminuendo, which is not particularly important in a continuo instrument.

Also, the tone quality of a harpsichord fits in with strings rather better than that of a piano; the problem today, which I mentioned last week, of the piano's inharmonic overtones, was less of a problem in the eighteenth century, for piano string tension was then much lower. That's one reason why the piano's volume was weaker than that of the harpsichord, for low string tension suits plucking but doesn't suit hammering. After about 1800, especially in England, the piano got quite a bit louder, so maybe Haydn presided at the fortepiano at Salomon's concerts for that reason. He took home a 1794 Broadwood because he liked it so much, and the firm gave one to Beethoven because he could not hear the lighter-toned Viennese instruments as he grew deafer; it was only early in the nineteenth century that the Viennese instrument grew louder than the English, so that Beethoven switched back to the local make.

There are two rival series of Haydn symphony recordings under way at the moment, and one advances many convincing arguments in favour of the use of a continuo instrument. The other advances many convincing arguments against the use of a continuo instrument. While I know which side I'm on, and you can probably guess which it is from the things that I've said, I believe that you should read the arguments, perhaps listen to the discs, and make up your own minds. Just remember that one day you may have to decide for yourselves!

In Haydn and Mozart's early symphonies, the wind section was confined to two oboes and two horns, at least on paper. There is a good deal of evidence, similar to that for the use of the continuo, that bassoons were also used, but there is seldom any distinct music for them, and presumably they simply played col basso, using their own intelligence not to exhaust themselves, by simplifying their parts, changing semiquavers into quavers or even crotchets or minims, and dropping out in passages for strings only. Bassoons by then had from four to six keys, and with six keys, which was the more usual, one should be able to play anything that Beethoven wrote without a great deal of trouble, and certainly anything in Haydn and Mozart. Where there were bassoon parts, it was obviously a very important instrument in composers' minds. Look at Mozart's *G minor* and *Jupiter* for instance, and see how often it is the bassoon that turns the corner, that leads one musical phrase into the next — they must be very satisfying parts to play. There was also obviously some feeling that the bas-

soon sounded as though it were an octave higher than it is. If you look through a few Haydn symphonies, you will see again and again the bassoon running with the first violins, feeling as though it were in unison with them, though of course it is actually an octave or two lower. The sound of the classical bassoon has a sweetness, when well played (there are occasional references to a similarity with an old goat to show that it wasn't always well played) which is totally lacking from the modern German instrument. The modern Viennese instrument, now nearly extinct, gets near it, and the French bassoon, although further away than the Viennese, is somewhat reminiscent, but to hear what I mean, and what Haydn and his contemporaries expected, you have to listen to one of the better early music bands, or, if you are a bassoonist, come into the Bate and experiment.

The oboists were often double-handed. A number of scores have oboes in the outer movements and flutes in the slow movement; it is highly unlikely that these were separate players (in fact, pay sheets often make it clear that they weren't), and obviously the oboists put down their oboes and picked up their flutes. They would have had plenty of time to do this while the horn players were changing crooks and blowing out the condensation (brass players usually refer to the key that lets the water out of modern trumpets etc as a spit-key, but in fact what collects inside the instrument is much more the moisture condensing out of the breath on the cold metal than it is saliva, which is just as well, for saliva would eat through the metal in rapid time). The fingering of the

two instruments was fairly similar, even though the blowing process, the sound generation, was quite different, and the parts were a great deal simpler than those of the end of the eighteenth century, so that doubling on these instruments would not cause much difficulty. Both oboe and flute had only one chromatic key, that for the lowest semitone, the E♭ or D♯, and the fact that the oboe had an extension key to lower the pitch to middle C would not cause any trouble. The flute was also extended to middle C within this period; Mozart used the note in his flute quartets.

It was in this period, too, say around 1780, that the flute started to acquire chromatic keys. I said a week or two ago that the flute was not very happy with cross-fingering, and that this meant that the instrument was much quieter than ours because players had to roll the embouchure in towards the lip to tune such notes as F♮. This gradually became less tolerable, particularly because of the greater chromatic freedom of music, both within the music and with composers writing symphonies in B major, F♯ minor and so on. Certainly by 1785 (when Richard Potter patented a flute of this sort, and it's not likely that he was the first) flutes were available with a key for each chromatic note, the middle C♯, F natural, G♯ or A♭ (we are still in meantone where these notes are more than a quarter-tone apart, and some makers pitched this key for G♯ and others for A♭), B♭ and the upper C natural. This was the 8-key flute which lasted until Boehm revolutionised the flute mechanism in 1847, and even longer in many areas such as Germany where the Boehm flute was slow to catch on. Composers

are always quick to take advantage of new developments of available instruments (we will see shortly why I say available), and the 8-key flute was that normally in composers' minds from 1780 or so onwards. The oboe, incidentally, did not require these keys because its reed, gripped between the lips, made it much more easily controlled by the player, and it had already had the middle C extension right from its invention in the 1660s or so. The extra chromatic keys don't really start on the oboe till 1805, 1810 or so.

The one woodwind which did not catch on was the clarinet. It was available from about 1700, but how many symphonies of Mozart's have original clarinet parts? There are only two. One is *no.39*, and the other is *no.31*, the *Paris*, written for a city where clarinets were presumably available. Only four have clarinets today, and they were later additions to both *35* and *40*. Have a look at Haydn's *London Symphonies*; there are clarinet parts in the first set, but they are very rudimentary — it's obvious that he was told that there would be clarinets in the orchestra and that he had got to include them (managements have always hated having some of the orchestra skiving off in the bar during part of the programme, and hated even more players having a day off), and it's equally obvious that he did not know what they could do, and he was playing very cautious. The second set is quite different; he'd heard them by then, and even more different are the two big oratorios. Mannheim with the Stamitz boys was quite another matter; this was a thoroughly up-to-date court orchestra, and it

included clarinets, and as a result there are clarinet parts in most of the music written for that orchestra, as well as a fair number of concertos for its players. Elsewhere, people were more cautious, and there was no point in writing clarinet parts if there were no clarinettists around, and no point in taking up the clarinet or buying it if nobody was going to write for it. A classic vicious circle.

Another problem with buying it was that it was more expensive than some other instruments. This was because it tends to be even worse at playing in distant keys than the flute, and as result players have always needed more than one clarinet. Leaving aside the small ones which were mainly military band instruments by now (several of the early concertos were for D clarinet), the standard set was, as it still is, a B♭ for flat keys and an A for sharp keys, plus a C for neutrals (C plus one up and one down). There isa good deal of evidence for some economy by using transposing joints; we have one earlyish clarinet in the Bate with B♭ and C joints, and the empty slots in its case show that it also once had A joints. However, this isn't likely to have been much more successful than the modern instruments where you push a lever and they change from B♭ to A; they're usually out of tune in both keys as well as hellish expensive and complicated.

The main problem with playing it, which also discouraged players, was the keywork. Because the clarinet is a reed instrument with a cylindrical bore, it overblows twelfths and not octaves. This means that instead of having six fingerholes, so that

one plays up the scale, opening them one by one, and then at the top covering them all and overblowing to the octave, one needs ten fingerholes. Since one also has to hold it up, and anyway the space that the ten holes take up is wider than the reach of the hand, this meant in practice that the equivalent of the one-key flute was the five-key clarinet, and the equivalent of the eight-key flute was the thirteen-key clarinet. This made the clarinet that bit more complex to play, and it was obviously enough to put players off in the beginning of this period.

The curious thing is that there must have been plenty of clarinettists around, not just because of soloists like Stadler (he only turns up in pretty late Mozart) but because there were very often parts in the opera orchestra, and even more often in the military band. The wind octet was the standard military band of this period; all the *Harmonie Musik* of this period was the equivalent of what you hear from the bandstand in the park today; now it's selections from current musicals, and then it was selections from the popular operas, and of course, both now and then, original music written for the band such as Mozart's *K.375* and *388 Serenades* of 1781 — here it is the first version of *K.375* that has the clarinets; the oboes were added the following year. It is in fact through the military band and the opera orchestra that many instruments have come into the symphony orchestra; both are far more adventurous than so-called pure music. For example, trombones were quite often used in the opera, certainly always for supernatural scenes such as the Commendatore's statue, and were standard

from about 1800; the heavy percussion comes in through both the band and the opera in the nineteenth century, and from the band for the Turkish Music in the eighteenth century. Things like bass clarinets, and possibly cor anglais, were imports from the band in the next century (it was only in the band that the tenor oboe survived in the eighteenth century, particularly the English vox humana), and the tuba, and its predecessors such as serpents and bass horns, were standard band instruments long before anyone wrote for them in orchestras.

One tenor oboe did appear in the period, and that is the cor anglais, as you will know neither English nor a horn (it has been suggested that the name may have originally been cor anglé, but that still does not explain the cor, nor does it allow for the fact that the earlier instruments were curved in a demilune rather than angled. Haydn scored two, with two horns, in his *Symphony no.22, The Philosopher* and some other works, Mozart included a couple in some earlyish Divertimenti, and Beethoven included it occasionally, mainly also in his early period. It didn't really catch on, though, till the late Romantic composers took it up.

There was also a larger size of clarinet, a tenor version of the instrument, which Mozart as well as some of his contemporaries employed from time to time. This was the basset horn, a tenor clarinet, but with the same bore diameter as the normal instrument. Normally, as instruments get longer, they get wider in bore in proportion, so as to keep a reasonably similar tone colour; the military band alto clarinet is an example of this. The basset horn

was very narrow in bore for its length, especially as it had an extended range, going down to the written low C instead of only to the E, and this gives it a characteristically hollow sound, quite different from that of the clarinet. As a result, it is a great mistake to replace it by clarinets, even when the clarinet can cover the range required by the parts, as it can in the Mozart *Requiem*.

And while we are talking of larger instruments, we should not forget the contrabassoon. It doesn't turn up often, but when it does, it is needed. Like the double bass, there are problems over its size and its range. Most contras of this period only went down to the D a 6th below the ordinary bassoon, like the Tauber instrument in the Bate Collection, a Viennese contra of just this period, but Haydn in his oratorios expected a full octave and presumably there were instruments that size around. No composer before Wagner wrote notes and then looked for someone to make him an instrument that could play them; composers then (and now if they have any sense and expect their music to get played) wrote for what was there.

The common brass instrument was the horn. This was due to the changes that we saw in last week's session — it had supplanted the trumpet as the main brass instrument because, with the new hand-stopping techniques, it could play diatonically in the middle register where it was far more useful than charging around in the top register. Also it was available in all keys, from C alto (which seems to have been a Bohemian speciality; I've never seen a French instrument with a C alto crook, but when we were going

through the stores of the Museum in Prague, we never found a horn without one. Haydn wrote many parts in this key). From C alto, or from B♭ alto outside Bohemia, down to B♭ basso was the norm, with the occasional use of such oddities as F♯ (in the *Farewell Symphony*) and A♭ (in the slow movement of Schubert's *Tragic*); A♭ basso seems to have been a later Italian habit (it turns up in a number of Verdi operas, and it may have been only an indication of tonality and range, like a number of Wagner's unrealistic crook indications). The only keys I can't remember ever coming across are B♮ alto and C♯ or D♭ basso (but Jonathan Williams is pretty sure he can remember a Gounod *Mass* that requires it).

The trumpet, on the other hand, was only available in E♭, D and C, a considerable limitation on composers, and in this period you will only find it in music in these keys. It meant that if a composer decided to include trumpets in a score, he had to write the piece in either C or D until about 1780 or later, when he then had the option of E♭ as well. This is something that tends to be forgotten today, the way in which the choice of instruments may have limited the composer in his freedom to choose a certain tonality, and of course vice versâ; if he was determined to write in the key of F, he'd have to do without trumpets. The F trumpet (and with it the E) did not come in until after 1800 — look at the keys that Beethoven used it in. This again was one of the advantages of the horn over the trumpet; the composer could write for it in any key. Only when in the minor did he have to think a bit; the reason that Mozart used one horn in B♭ alto and one in G in the *G minor* (and

a pair in each key in the little *G minor, no. 25*) is that the G horn could not play the mediant in the minor-key movements, whereas the B♭ horn started on that note and could also play the dominant (the 3rd of B♭ is the 5th of G) as well as some other useful notes.

The horn was also now quite a quiet instrument, due to the hand in the bell, and therefore blended well with other instruments in the smallish orchestras that we are considering. The ideal of the hand-horn player is a completely even tone quality, and this can only be achieved by stopping all notes to a greater or a lesser extent; if some notes are open, and others stopped, there will be too great a contrast between them. Another ability of the horn is to produce factitious notes in the bass register (players call it lip-faking), something that Haydn took advantage of occasionally. You will suddenly see some quite extraordinary notes in the second horn part, way down below the bass stave, and wonder what's going on — this was Haydn having fun and waiting to see the player's face when he looked at the part. He occasionally went to the other extreme — have a look at the Minuet of *99* and at *31*. I suspect with the latter that he may have been taking the mickey out of a pair of peripatetic players who arrived at Esterhazy, saying how good they were, but that's only guess work on my part. Certainly the clarino technique did seem to survive on the horn longer than on the trumpet (it's rather easier on a 12-foot tube than on a 6- or 7-foot one), for Dittersdorf does the same sort of thing in one of his Divertimenti, and so did Rosetti in his concertos. The horn players, particularly the second horn, the cor basse

for whom most of the solo parts were written, was expected to have a very wide range, from the 2nd to the 16th partials, the written C below middle, to the C on the second leger line above the treble clef. As a result, the horn became very much a maid of all work for most composers of this period.

As for the instruments themselves, the horns hadn't changed much. Tuning slides were universal, of course, by now, and we have a good selection of hand horns in the Bate. Trumpets also show little change, save that in England, by the end of the eighteenth century, the slide trumpet had been developed. This had a slide in the back-bow which allowed the player to flatten the pitch by a tone or so, quite enough to tune the problematic 11th partial and get an occasional A and B in the middle register, and maybe even an F and D, so filling the middle octave diatonically. We have one of the earliest slide trumpets in the Bate, a natural trumpet of about 1720 which was converted to a slide trumpet.

The timpani were still tied to the trumpets; no trumpets, no timps. Haydn, an innovator as so often, freed the timpani's part from that of the trumpets, so that once they were there they often play independently, though not often as independently as in *103*. It was also in this period that other percussion started to come in, though only as local colour. Very fashionable in military bands in the late eighteenth century were characters, often negroes, dressed up as Turks (remember that the Turks were still the enemy and still the infidel to Central and Eastern Europe, for the Turks were on the border at Belgrade) playing on instru-

ments based on those of the Janissary Bands. These came into the orchestra either for pseudo-military music (Haydn *no.100*) or for the popular alla Turca (Michael Haydn's *Turkish Suite* and Mozart's *Il Seraglio*). They were even built into the piano, with a pedal that thumped the soundboard to imitate the bass drum and a real cymbal and triangle built in, either sharing a pedal or with one each. Mozart's *Rondo alla Turca* sounded a bit different on the pianos of his day than it does now. The Turkish instruments were the bass drum, cymbal and triangle, and, in the band, the Turkish crescent or chapeau chinois, a pole with a lot of jingles or small bells attached, which did not get into the orchestra until Berlioz's time, or at least there is no written evidence for its presence. The bass drum was played in Turkish style, with a solid beater on the strong beats and a light switch of birch twigs (like a miniature besom or witch's broom) on the off-beats; that's why a reputable edition of the music prints the bass drum part with some stems pointing upwards and some downwards. The modern thump thump thump all the time is quite unrealistic. The cymbals were smaller and thicker than the modern, rather more bell-like and certainly much quieter than ours. The triangle still had the rings on the horizontal bar, so that its sound was much more a continuous rustle than the telephone-bell of the modern player. The effect of the Turkish instruments was exciting enough; it did not have to drown the rest of the orchestra. It's probably because the sound of those instruments was fairly light that the composers did not include the side drum and the tenor drum, which cer-

tainly existed then, in their symphonic military music; they would have been heavier in sound and might have upset the orchestral balance. The timpani were shallower than modern instruments, though by now often about the modern diameters of about 24 and 27 inches, something like the pair of Potter military timpani in the Bate. They were still usually played with wooden sticks, though there may sometimes have been cloth or chamois leather round the wooden heads.

An instrument that did not often appear, and I don't know why not, was the harp. It was certainly available, and it was fairly chromatic (it was single action, so there were some limitations). Perhaps it was too strongly associated with pretty ladies, playing as amateurs to their devoted families, to be regarded as an instrument for orchestral use; certainly Mozart was rude enough about having to write a concerto for the thing, and he didn't otherwise write for it so far as I remember. Even Beethoven used it only once that I've come across.

The string instruments were only beginning their changes that I spoke of last week. Violin fingerboards were getting longer, pitch was certainly rising (about A=430 in London), bridges were getting higher, and the bow was in the its full modern shape before Mozart died, and well on its way to that state before he was born. I have a suspicion that it may have been the cello that started the increase in range which the longer fingerboard allows. If you look at cello parts in the classical period, especially the earlier part of that period, the cello goes much higher in relation to its basic

tuning than the violin does. Not so much perhaps in the orchestral repertoire, but certainly in its chamber and solo music. Look at some of the Boccherini parts for example; way up in the treble clef. Of course, it's much easier to run your hand down a cello fingerboard when it's stretching down in front of you than it is to reach up a violin fingerboard when not only are you twisting your wrist but also taking some of the weight with your thumb (there were no chin-rests till about 1820, when Spohr introduced them). We have astonishingly little contemporary evidence about the changes to string instruments (we have the instruments but little information on who first did what to which) and nobody has said in print, nor so far as I know in memoirs, that X led the way in the conversion of the violin, or that Y first modified the cello (which I suspect may have been where it started). So all that we can say is that the string instruments were somewhat louder than they had been, with a considerably higher range, though not yet as high as, for example, the Beethoven *Violin Concerto*, and that bowing was very much freer, with true staccato, coup d'archet, and other effects.

There were more of them, certainly. This, too, was one of the results of the social changes I spoke of last week and the beginnings of the concert hall. Orchestras got larger so as to be more audible and so as to balance to more piercing sound of the narrower-bored oboes, the louder sound of the flutes than the recorders, and the greater number of wind instruments in general. It would seem, too, that they got less competent. The first violins

were obviously OK, but it looks as though the seconds were not so hot; either that or the harmonic, rather than contrapuntal, nature of the music led to much duller inner parts for second fiddles and certainly for violas. There is nothing in this period to compare with the *3rd* or *6th Brandenburgs*, and if one can judge the standard of playing from the music, it is perhaps just as well that Bach's music was ignored.

Bass players were still playing colla parte with cellos, and unless they, unlike second violinists and violists, were really hot stuff, they must have simplified their parts. Listen to modern bass players, who wouldn't dream of simplifying by playing only the first of each group of four notes, ploughing their way through the *G minor*; what lies reasonably under the hand on a cello neck is a right scramble on the longer neck of the bass. This is something else that we have little information about; just what did people play, in relation to what was written. And to what extent did composers leave it to the players. Did Mozart write those parts, knowing that he wasn't going to hear them? I can't believe that he wrote them knowing that he was going to hear a right mess. Of course, the composer was usually there when the music was played and could tell players what he wanted, but I am pretty sure that, even when he wasn't there, he knew that the bass players had the sense to play the music rather than the notes, adding their 16′ or if below the range their deeper tone colour, on the structural notes of the bar. I suspect that what we hear today, with our mania for playing the notes, all the notes, and nothing but the notes,

is a travesty of the music that the composers heard, not only in their mental ears, but also in performance.

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Beethoven and Schubert

With Beethoven we reach the beginning of freedom, very appropriately when you consider his political views. When he started his career, the woodwind could cope with most things; by the time he died, they should have been able to cope with pretty well anything, and valves had been invented to allow chromatic parts on horns and trumpets, too. Still, music is written for people to play, not for the instruments to play by themselves (leaving aside such aberrations as musique concrète and computer-driven electronics, and in this context electronics in general). The fact that an 8-key flute had a key for every note in the chromatic scale did not necessarily mean that you could safely write for flute in any key, and Beethoven obviously thought it safer when writing in B♭ in the *4th Symphony* to stick to one flute and avoid the risk of a pair being out of tune with each other. Equally, even though valves for brass instruments were invented about 1815, he never wrote for valved horns or trumpets; not even for the key trumpet, invented in about 1795, for which Haydn and Hummel wrote their concertos and which, especially in the opera houses, did get into the orchestra, though perhaps rather more often in Italy and South Germany than in Austria. There is, incidentally, a lot of

nonsense written about the 4th horn part of the *9th Symphony*; there is no reason to assume that this was a valve-horn part. It can be played quite easily by a good handhorn player, and the reason why it is for the 4th horn is equally easy. There are parts for two pairs of horns, one pair in B♭ and the other in E♭, which allows for a much greater range of possible notes on natural instruments. Where the famous solo passages come, the tonality is such that they need to be on the E♭ pair, and it was the tradition throughout the classical period and beyond that the second horn, the cor basse, had the bigger range and the greater facility at nipping around the instrument. So the solos were written, logically enough, for the 2nd horn of the E♭ pair, who happen to be the second pair and thus numbers 3 and 4 as we reckon them today. Similarly, it's always the 2nd horn in wind-band music who has the batteries, the flourishes of arpeggios; this is also why it's the 2nd horn who has the solo at the beginning of the allegro of the *Fidelio Overture* with the quick dive from the 12th partial, the top G, down to the 2nd, the bottom C. What has caused the confusion, and the spilling of much ink, is that this particular passage in the *9th* is more extended than the usual flourish, as is the whole movement, and also more chromatic, but that is also true of the whole movement and indeed of the whole symphony. The slow introduction of *no.7* goes quite a long way out of the usual harmonic framework of the period ('Beethoven is now ripe for the mad-house' said a critic, as I'm sure you've heard only too often; it was that slow introduction that Weber was referring to), but *no. 9*

goes right out into uncharted territory, a harmonic world which Beethoven ventured even further into with the last quartets. Still, we are getting ahead of ourselves.

In the forces that he wrote for, Beethoven was following on from his predecessors and his teachers. He split his basses from his cellos, taking care not to take the basses out of their range either at the top or at the bottom, but much more because he did not think of them entirely as a unit, as the tutti bassi of the previous generation; sometimes he wanted them playing different things, and in particular he sometimes wanted the cellos playing something without the basses always hanging on to their coat-tails. I'm not going to say that he was the first to separate them; the first of the great composers, yes, but to see who actually did it first would require months of ploughing through dead manuscripts in libraries, and I'm afraid that that's not my line of country.

What he did with his forces is something else again. I remember Norman Del Mar saying years ago that even a single chord of Beethoven's was instantly recognisable as his work; you do not need a turn of phrase, a style of melody, or a harmonic progression to recognise his work; one chord was enough. I'm not an analyst, and I'm not going to try to work out how Beethoven did it; I'm just prepared to say that he was Beethoven.

His orchestra was rather larger than Mozart's and Haydn's, and certainly this is true of Beethoven's early works as compared with their early works. He was writing for public concerts, not for salons. He had as a matter of course a full wind section available

of pairs of flutes, oboes, clarinets, bassoons, horns, trumpets and timps. He still had to be careful about the trumpets; they were growing shorter all the time, but E♭ was as short as they had got even by 1808 when he wrote the *Pastoral*; hence C trumpets in the F major scherzo and finale and, in between, E♭ trumpets in the F minor storm. Hence also the D trumpets in the A major *7th Symphony*. By 1812, the trumpets had taken the next step up, and we have the F trumpets in the *8th Symphony*, and that was the size that they stayed at for most of the nineteenth century. In case you're not clear what I'm talking about, although this is really a matter for my History of Instruments course, the basic pitch of a brass instrument depends on the length of its tube, and the lower part of the set of partials of the harmonic series, at this period from the 2nd, the octave of the fundamental, to the 12th, is available in that key. You can increase the length of the tube, and so get a series of partials, each a tone or more lower, by adding short loops of tubing called crooks. So, you can either build a trumpet in C, about 8′ long, as they did in Monteverdi's time, or you can build it in D, about 7′3″ long, as they did in Bach's time, and make a 9″ loop of tubing to stick in between the mouthpiece and the instrument and thus change the key to C. Then trumpets could play in either of those two keys. Shorten it again to 6′6″ or so, and we have E♭ to which we now add two crooks for D and C. Add an even longer crook to produce a total tube length of 9′ the same length as the tenor trombone, and we can manage Beethoven's *4th Symphony* and the off-stage calls of *Leonora 3* and the opera,

but don't expect a very good tone quality while you're doing it because the tube will be really rather too long to suit a trumpet (hence the small use of the trumpets in the *4th Symphony*). The *Fidelio* calls repay a little study; they only come in two of the overtures, where there are interesting differences between them, and I don't know what happens in the earlier versions of the opera. Anyway, getting back to the subject, it would appear that there was little demand for a 6′ tube for an F trumpet until well into the nineteenth century, and this was why Beethoven had to take that extra care. Still, by 1812 it only meant that there were two diatonic keys unavailable, G and A. I'm not sure when the gap was filled; certainly not by 1833, when Mendelssohn had to use D trumpets in the first movement and E trumpets in the 3rd and 4th of the A major *Italian*. Even by Wagner's time, when he was writing for valve trumpets, the F trumpet was the still the standard instrument, and that goes on into Mahler's period. There never really was an A trumpet, other than a quick-change valve on B♭ trumpets for the dance band; there was the single step straight from F to B♭.

Getting back to the top of the score, Beethoven occasionally uses the piccolo, and by this time there is no doubt that it was what we call a piccolo, a small transverse flute sounding an octave above the normal flute and an octave higher than written (octave instruments, whether above like the piccolo or below like the double bass, are not normally considered to be transposing instruments, though strictly they are of course). Mozart's piccolo

(eg in the Turkish Music in *Seraglio*) is often thought to have been a flageolet or a small recorder, as Vivaldi's certainly was, though we know that Rameau used what we would call a piccolo. Bass flutes existed, but they were not used in the orchestra, nor were the small B♭ flutes (the fifes) nor the F flutes, though Beethoven did write for both of them in some military marches; the military band was growing larger, too. He does not seem to have regarded the cor anglais as an orchestral instrument; it only turns up in his chamber music as far as I know.

Bass clarinets, and also the small E♭ and other high clarinets also existed, but again only in military music, and Beethoven's orchestral scores stick to the normal three treble sizes of C, B♭ and A. The C only dropped out in this century, the 20th, and it is now beginning to make a come-back because some of the more discriminating players realise that its tone colour is different from the B♭ and that it is worth having. Tone colour depends much on the ratio of bore to length, and because all three treble clarinets are made to accept the same mouthpiece, so that a player can change quickly from one to the other without having to warm up a new reed, inevitably that ratio must change since the lengths must be different to produce the different pitches. Because the clarinet overblows a 12th, not an octave, and because like the flute it is not that good at cross-fingering, it is usually happiest playing in the written keys of C and F. So one used the C for that key and for F, the B♭ for that key and E♭, and the A for that key and D. For other keys, one did the best one could, but if you think through the

repertoire, there weren't so many other keys in use for orchestral writing before clarinets got enough extra mechanism to cope with them, and it was with the coming of the extra mechanism that players started to decide to save their money and manage with only two clarinets instead of three, and even sometimes with only one, a B♭ with an extra semitone at the bottom so that it could manage an A part at a pinch.

Contrabassoons were obviously available when required, but Beethoven only used them in the *5th* and *9th*, and then not all the way through. Again they were military band instruments; Krommer, for example, uses the contra in all his wind band music, though he normally simply doubles the second bassoon at the octave, whereas Beethoven was more inclined to treat the contra as a wind double bass, and personally I'd be interested to know how well the players got on with those parts; they tend to be stinkers. On the whole this wasn't something that Beethoven usually worried about. He wrote the music, and if the players couldn't cope, they had better go away and practice till they could. The same applied to his singers. It is sometimes said that if we performed the *9th* at the proper pitch for the period, it would make things easier for the sopranos and tenors; it isn't true; it would burst them. The *9th* was written for London, and pitch was already well above modern in London by the 1820s.

What of the woodwind instruments themselves. Still not a lot of change. The flutes had eight keys, as they had last week. The oboes were beginning to add keys now, and you start to get the odd

chromatic key from about 1800, usually at the player's whim. One oboe will have a low C♯ key; another will have an F key; a third a G♯ or a B♭, but none of this was systematised,and oboes didn't get really complicated much before the 1830s or 40s. Clarinets were adding keys because of their own internal problems, and you get eight or nine keys quite early in the century and twelve or thirteen by 1830 or 40. Bassoons, too, added a couple of keys to the wing joint, more to act as speakers or vents to help high notes than for chromatics, though a low E♭ key came fairly early on.

I've already talked a fair amount about the brass, but it's worth noting some of the things that horns could or could not do. They were not so hot at changing key quickly, which is why there is a 3rd horn in the *Eroica*; 2nd and 3rd can keep things going while the 1st gets into F for the solo at the recapitulation of the first movement; Beethoven gives him 41 bars to do it in, including the famous 2nd horn 'false entry', and 89 bars to get back into E♭. I find this a bit odd, because in the opera pit, and presumably orchestral players weren't any thicker than opera players (usually they were the same chaps), there was sometimes only a couple of lines of dialogue or recitative between one aria and the next, and if they were in different keys, and if horns were in both, they'd have to change crooks just like in the *Eroica*, but a great deal faster. Clearly, despite what he wrote in the *9th*, horns weren't any too hot at chromatic or quick diatonic work in the bass, and this is why although there are four horns in *Fidelio*, he uses only three plus a bassoon for the big horn passages in the 'Abscheulicher', letting

the bassoon do the 4th horn's job for him. Other evidence for the interchangeability of horn and bassoon sound at this period is in the *5th Symphony*, where the bassoon has in the recapitulation the little solo that the horns have in the exposition; in the exposition it's on four good open notes, but in the recapitulation it's on two widely open notes (written E is a flat harmonic and has to be opened out to be in tune) and two half-stopped notes, and Beethoven obviously didn't want the changes of tone that would result. He had no hesitation about writing stopped notes, and sometimes he obviously intended the sound that Mahler, Ravel and Debussy indicated with a small + over a note; if you write an F on the top line and mark it sforzando, the inevitable result is that brassy sound, because the player has to stop down for the F and blow hard for the sf.

The valve horn was certainly in existence in Beethovens lifetime; valves were invented in 1815, and they were invented by a horn player. We know that Schubert wrote his song for horn and tenor and piano, *Auf dem Strom*, for Levy, and we know that Levy had a valve horn; this is, in fact, the first work that we can say positively was written for a valve horn. Whether Levy played in the *9th Symphony*, and whether he was the fourth horn if he did, we don't know, but as I've already said, you don't need a valve horn for that work. *Auf dem Strom* was written in the last year of Schubert's life, after Beethoven had died. Another work which is a real snorter for the hand horn is Schubert's *Octet*, but I've never

checked on who it was written for; it's not impossible, just very nasty indeed.

I don't think I need say any more about trumpets; they are about covered already. Trombones come into three of the Beethoven symphonies, oddly enough only a pair in the *Pastoral*, the alto and the tenor. There were still three distinct sizes in Beethoven's day, the alto, tenor and bass, and listening to someone screaming away at an alto part on the top range of the tenor trombone gives a rather false impression of how they sounded. His alto parts lie quite high, though not impossibly so, and there is a big difference in tone quality between playing those parts on the right instruments and all on the tenor. The same applies to the horn, of course; playing the high-lying parts of the finale of the *7th* on an A horn has a hysterical quality which Beethoven certainly intended, and which is lacking on the F alto and completely absent on the B♭ altissimo; on the other hand it was even more hysterical than Beethoven intended on the old F horn, which is why the Aubrey Brain generation used to carry an A crook as well as an F for their old piston valve horns. Trumpets too; playing everything on the B♭ makes it all sound the same, something that I want to come back to next week, for modern players have concealed one of Wagner's strokes of genius.

Beethoven wasn't really at his best with trombones, to my mind; he never really exploited the fully chromatic possibilities of their slides, and Schubert far outdid him in this with his parts in *The Unfinished* and the *Great C Major*.

Tubas hadn't been invented, and Beethoven never used any of the serpent family, although various of them were around in most military bands. The Krommer contra parts are usually 'or serpent' and it's interesting as an aspect of tone colour that the serpent was always thought of as a 16′ instrument although it is actually an 8′ one, with the lowest note the same as the bassoon's. The very wide bore provides a richness of tone which was thought of as sounding an octave lower than it did. I remember Francis Baines suggesting to me once that this was true of the violone as well, to go back three or four sessions; that it was actually in unison with the cello but that the much bigger, and especially much deeper body from front to back, gave it a tone quality that sounded as though it were an octave lower. Could be, though I'm not wholly convinced.

Beethoven totally changed the way in timpani were used. They were now instruments in their own right and no longer bass trumpets. They could play anywhere in the score, not just when trumpets were playing, and they could be tuned to any pitches required, though more often than not they were still on tonic and dominant since these were the two most useful notes, and there were still only two of them. He had no hesitation, though, in asking for other pitches, such as the tritone in *Fidelio*, which is a stinker to pitch, and the octave in the *8th* and *9th*, which is worse. The octave is tricky because the overtones of a drum head are not wholly harmonic, and the octave overtone of the low drum will sound sharper than a true octave; so either you stretch the

octave by tuning the high drum a bit up, and risk your octaves sounding sharp, or you tune it true and risk a clash between it and the overtones of the low drum; either way you're likely to be wrong. Passages that are now tricky to play, such as the very common pattern of two notes on each drum rapidly alternating, were no problem in Beethoven's day because with wooden sticks on thicker heads, players used the same sort of bouncing stroke that we still use on the side drum. Unfortunately, that technique doesn't work on our thin skins or plastics with felt-headed sticks and so this figure, as in the finale of the *8th*, is always a worry to drummers.

The military band of the *9th Symphony* calls for the same instruments, and the same techniques, as in Haydn's *Military* and Mozart's *Seraglio*, with beater and switch on the bass drum, itself an instrument with a much smaller diameter and therefore much less boom than the modern bass drum. Whether the triangle still had its rings, we don't know; we can be sure that it had lost them by 1855 when Liszt wrote his *E♭ Piano Concerto*. I'm pretty sure it had lost them by the *9th* because the writing is quite different from Mozart's and Haydn's. Other percussion only comes for special effects. There is a side drum part in the *Egmont Incidental Music*, and parts for side drums (in quantity), large bass drums laid on their sides so that they can be clouted more effectively, and ratchets, the things that are used at football matches or on farms to scare birds and were then used by town watchmen going their rounds, in the worst symphony he ever wrote, *Wellingtons*

Sieg oder die Schlacht bei Vittoria, more often known as *The Battle Symphony*. This was originally written for a large size in barrel organs, invented by his pal Mälzel (the inventor of the metronome), though it ruined their friendship, but he later scored it out for live musicians. It's an entertaining score in its way, and worth looking through if only as an example of how even a good composer can go wrong.

Percussion were, of course, becoming more routine elsewhere. Rossini got himself the nickname of Tamburossini simply because of his use of percussion, for instance bass drum in the *Barber* of 1816, side drum in the *Magpie* of 1817 and so on. There is very much a question on whether the use of a bass drum implies cymbals as well or not, and the general conclusion is that it does; it seems to have been this period in Italy which initiated the coupling of the two instruments which became a nineteenth century cliché. For that matter, one should not forget Ferdinand Kauer and his Percussion Enterprises in Vienna at the beginning of the century. For this, see R M Longyear's article in *Galpin Society Journal* 27, but I don't think that it's something that need be taken very seriously; Mr.Kauer seems to have been an eccentric who had no effect on mainstream Viennese composers. Still, one should remember that the stuff was around and available.

Having mentioned Mälzel just now, perhaps we should note that Beethoven was the first composer consistently to mark in metronome readings. They have caused a great deal of trouble ever since. To take only two examples, the Finale of the *4th* and

the *5th* are marked very much more slowly than you'd ever hear them today, and some other movements are marked quite a bit faster than even some of our modern showmen would dare take them; Weingartner said of the first movement of the *4th Symphony* that "The prescribed mark semibreve = 80 gives an absolutely impossible speed" and he marked it down to minim = 126. His book On *The Performance of Beethoven's Symphonies* is still worth reading as long as you don't follow his advice on re-orchestrating. Nobody has ever really managed to work out which metronome marks are right and which are wrong, but one aspect that is worth bearing in mind is relative speeds within a movement, as for example the reappearance of the Scherzo in the Finale of the *5th*; I leave it to you to look it up. The early music bands, of course, using the original instruments, do find that they can play up to most of Beethoven's marks, and it does seem to be the character of our modern instruments that makes things difficult here, rather than Beethoven's markings. The same can be said of his piano parts; his bass writing is often criticised as muddy, but it's the modern piano that's muddy; hear Melvyn Tan or one of the others who plays Beethoven on Beethoven pianos, and there is no problem; the bass is clear enough.

Among the strings, the harp, as far as I know (and I've not been right through the Beethoven Collected Edition, which, incidentally is fairly inaccurate in detail; we badly need a revised Beethoven) only appears in *Prometheus*, and not much then. The piano was increasing in power and in range throughout his life-

time; it wasn't an orchestral instrument, of course, but there are those figured basses in some of the piano concertos to worry us, and I want to stress the point I've just made, that those critics who complain of the muddiness of Beethoven's left-hand writing are actually criticising the modern piano, not Beethoven; the bass lines sound alright on Beethoven's pianos.

Most of the better players would have been likely to be playing on violins in modern state by the time of the *5th Symphony*, and pretty well everybody by the *9th*, so string tone should have been brighter, coarser if you like, throughout his career than it was for Mozart (Haydn must have met modernised violins in his later years), and the same would go for the lower strings. Certainly a virtuoso violinist was expected to climb a lot higher than before (look at the *Violin Concerto*, especially the slow movement) and where a soloist leads, the rest follow. I don't know whether we know anything about musicians' training in this period, but when I was a student at the Guildhall, practically every violin student was being trained as a soloist, slogging through all the concertos and never looking at orchestral parts in their lessons (they did play in the school orchestras, of course); if it was the same in Beethoven's day, then what was happening in concertos would have been a part of their training, and this is why I say where a soloist leads, the rest follow.

Bows, of course, would all have been modern pattern and so players could have done anything then that they can now so far as bowing technique was concerned. The only limitation was the

absence of a chin-rest before 1820 or so, and, as far as we know, the absence of a cello tail-spike, both of which, certainly the former, affect left-hand movement and thus phrasing, the way that notes are linked together. When I was a boy, there were still players who as a matter of course inserted a slide between notes, and this must have been much more prevalent in Beethoven's time. Presumably he expected it and allowed for it; jumps that we hear now as clean 3rds, octaves, or more, were then lightly filled, and this is another aspect of the sound which has changed and which perhaps we should allow for when considering the sound of the orchestra. It's a sound that we don't hear much from the early music orchestras, to my mind nothing like as much as we should. Players are inevitably conditioned by their training, and their training today is to jump clean. Perhaps if we reach the stage of players being trained right from the beginning on early music, we may hear this again, but that's unlikely to happen; can you imagine a child starting from the age of seven or so on early music?

I've hardly mentioned any of Beethoven's contemporaries. To a great extent this is deliberate; there wasn't anything available to Schubert that wasn't available to Beethoven (though, as I've mentioned, his horn writing in the *Octet* suggests to me a possible valve horn) and we know that Levy, the horn player for whom *Auf dem Strom* was written, played the valve horn. His orchestration doesn't sound the same as Beethoven's, but that's the difference between two composers, not between two orchestras, and as I said earlier, Schubert was better than Beethoven at handling

some instruments such as the trombone. For that matter, I don't think that Brahms used any instruments that Beethoven didn't; he handled them very differently, and almost certainly, as far as the horns were concerned, they were played very differently, but that was because Brahms was still thinking of hand horns, whereas his players were certainly using valve horns. Brahms was, to some extent, old-fashioned in his day; perhaps that's why the Viennese liked him where they could not stand Wagner. The Brahmsesaal at the Vienna Philharmonic is a charming small concert hall, just across the passage from the main concert hall; the Wagnersaal is used for hanging hats and coats.

I'm afraid that I don't even know who was writing in France at this period; they may have been rather over-occupied with Revolutions and Empires. There was Cherubini, of course, who first sent valve horns to Paris, but I'm ignorant of his music, and I don't know any of Meyerbeer's either; he was a bit later anyway. The man that I've forgotten to speak of was Weber, who was Beethoven's contemporary. His music is so different that I, at least, think of him as the next generation, which is a mistake. They are, in fact, almost Janus heads in their treatment of instruments; Beethoven looks back to Mozart and Haydn; Weber looks forward to Schumann and Brahms. Take just the clarinet as an example (very much a favourite with Weber, anyway). There's nothing in Beethoven that you can't play on an eight-key clarinet, and not much that you can't play on a six-key, whereas Weber was writing for the latest model with at least thirteen keys. He uses four horns

as routine. When you think that both *Freischütz* and *Euryanthe* were written before the *9th Symphony*, we are in a totally different sound-world, one that we shall be considering next week.

— 7 —

Berlioz and Wagner

This again is a period of change, though mainly among the wind instruments and the percussion, and also, though this is not so relevant to the orchestra by now, to the piano and even more to the organ; both are dealt with in sufficient detail in my Industrial Revolution and Music lectures, and, because neither are normally orchestral instruments, they will not be discussed now save to say that one can consider the piano to have reached its modern state by about 1870-80; earlier than that one must be prepared for some differences of sound and therefore of balance in works for piano and orchestra.

All the woodwind changed in the second and third quarters of the nineteenth century from the classical instruments, with the slight improvements to their keywork that we have already noted, to their modern forms, due to the influence principally of Adolphe Sax and his father Charles, and of Theobald Boehm. The brass instruments changed radically with the invention of the valves and the resulting introduction of new instruments and the very considerable changes to older ones. The timpani acquired new mechanism for rapid tuning, and also altered their sound, and the bass drum, cymbals, triangle and tambourine became accepted

members of the orchestra, plus a few odds and ends that we'll encounter as we go along, which were available but which were less often used.

The only real change among the string instruments was an increase in numbers. By now at least a dozen of each violin, 8-10 violas, a similar number of cellos and at least half a dozen basses would be normal and quite possibly more. All the violins and violas would by now have chin rests, which allows much greater freedom in position changing, although one would still have heard some portamento, especially on larger shifts (it helps the player to locate where he is going if he can hear himself get there, rather than stabbing down a finger and hoping he's in the right place; the modern dislike of portamento has meant that players' technique has had to improve out of all recognition — perhaps it has been that the improvement of technique, which we have heard on all instruments, has led to the lack of necessity for, and thus the dislike, of the portamento. Whatever you think about technique or portamento, it is undeniable that players like Kreisler and David Oistrakh had something that modern players do not — you could call it soul). At this period there was little vibrato in string playing — it was still thought of as an ornament to warm-up a long note or to make a phrase more expressive. It was always said to be Joachim who introduced the continuous vibrato, but listening to recordings that he made as an old man, it is clear that what Joachim meant by vibrato is not what we mean today; he used something akin to the modern vibrato as an ornament, and the

rest of the time his vibrato was very slight, just enough to keep the sound alive. As one very highly esteemed player, who used to lead an orchestra for me, told me, the real function of the wide modern vibrato is to cover up inaccuracies of intonation; a vibrato covering most of a quarter-tone also covers a multitude of sins. If your vibrato covers a quarter-tone, you can take the risk of just stabbing down a finger on a large shift.

There is still a good deal of doubt whether cellists were using tail-spikes. Certainly they were available (some form of spike had been available in the eighteenth century), but some pictures seem to show the between-the-knees grip, and others still show the use of foot-stools to rest the instrument on. Certainly, the idea of getting right behind the instrument was later; this is said to have been introduced by Casals to make it easier to reach the high positions. We still badly need a good history of the cello, which has always been neglected in comparison with the violin. Even more neglected is the viola, but it is fair to assume that its development has paralleled that of the violin, since both are held in the same way, which is why I said earlier that both were played with chin-rests by now. It would be a fairly stupid viola player who didn't use a gadget that was obviously helping the chap on the next desk.

Basses were still more often three-string than four. We have in this period, for the first time, direct evidence of what all the instruments of the orchestra could, and should, do. This is Berlioz's *Traité d'Instrumentation et d'Orchestration* of 1844. In it, while

he says that both three- and four-string basses exist, the former tuned in fifths from A down to G (top line to bottom line of the bass stave, sounding an octave lower), the four-stringers, tuned in fourths from G down to E as today, are preferable, both because of their greater range and also because the interval of a fourth is easier for the hand to stretch, and thus greatly increases the facility of playing. He puts in a strong claim, which so far as I know has always been ignored, for a mixed tuning of thirds and fifths, with E and G at the bottom and then fifths to D and A, thus combining the ranges of the three- and four-string instruments. Wagner certainly always assumed that basses went down to E, and so did Schumann and Brahms, and it may well be that in Germany and Austria they more often did so than in England and France; it was, in the next generation, in Vienna that Mahler demanded at least some basses going down to low C.

An element of string technique that Berlioz is keen on is the use of harmonics, on which he goes into considerable detail for the violins, and mentions them briefly in connexion with all the other strings, including the basses. He describes both the natural and the artificial harmonics, noting which of the natural are bad or difficult, and among the artificial, though covering pretty well all possibilities, stressing that those produced by touching the string a 4th and a 5th above the fingered note are much the most effective. The use of harmonics, a radically different tone colour which thus expands, as it were, the range of string instruments available in the

orchestra, really came into its own somewhat later, with Mahler and Ravel among its principal exponents.

Berlioz describes also the best ways of writing for the harp. The instrument itself had not changed from that described last week, but it had become more acceptable, at least to those composers of romantic bent, and perhaps it is fair to say more for the opera than for the symphony as yet. The harp is a very tricky instrument to write for because, although it is fully chromatic, this is only achieved by changing, with the pedals, one note to another. Thus certain chords and progressions don't work, and the composer who writes for harp as though it were a piano stripped of casework and keyboard and stuck up on end is in for a nasty shock (unless he has Harpo Marx to play for him). Berlioz covers in great detail what can be done and what can't, and his own writing is beautifully laid out for the instrument. Both he and Wagner made great use of the harp, and both liked to use it in some quantity, with anything from two to a dozen harpists.

He is equally detailed in what he writes about the wind instruments, for example listing all the trills which are practicable, and all those which are not, as well as those which can be played but which were difficult with the mechanisms of his period which, in the revised edition of the Traité includes the Boehm system flute. This, however, was not available until 1847 and thus we must assume that Wagner's earlier operas were written for either the eight-key instrument or, more probably since Wagner was usually well up-to-date, the first Boehm system, the conical Boehm

which, while a considerable improvement on the 8-key flute, was not so powerful, nor so well-equipped for playing in all tonalities, as the later cylindrical Boehm system, which we still use today. The piccolo was a regular instrument certainly by the time that Wagner wrote *Rienzi*, and later he asks for two flutes and two piccolos. Berlioz describes briefly the F flute, a third higher than the normal instrument, and two of the high band piccolos, but ignores the B♭ flute, the fife. He has a good word for the flûte d'amour, a minor third lower than the usual size, saying that it is silly to allow it to drop into disuse, but says nothing about the bass flute which presumably had temporarily vanished (it appears in Diderot & d'Alembert's *Encyclopédie* in the eighteenth century, and reappears in time for Ravel and Debussy; I don't remember that Wagner ever asked for it).

The cylindrical Boehm flute, which was invented in 1847, was a much more powerful instrument than the conical flute. It meant that the flute could far more easily cut through the rest of the orchestra and, especially, that it was stronger in the lower part of the range where the conical flute is weakest. Because all its finger holes are the same diameter, its tone is much more even over a chromatic scale (the conical Boehm was far more even than the 8-key flute, but still had some inequalities). It was adopted most quickly in France, as the conical Boehm had been before it, and, in variant forms such as the Rudall Carte 1851 and 1867 systems, in England. In its own country of Germany there was strong resistance, and the German Reform Flute, an elaborated

8-key conical instrument, remained long in use. I regret that I simply do not know which instrument was used in Bayreuth, for Wagner, nor in Austria and Germany for Brahms and Schumann, though I strongly suspect the Reform flute there, nor in Prague for Dvořák, nor in St Petersburg for Tschaikowsky; there are a lot of gaps to be filled in the detailed history of orchestration.

Berlioz gives B♮ as the lowest note of the oboe, which had been achieved by fitting a key to cover the open bell vent, but says that some go down to B♭ as they do today, and he gives the same ranges for the cor anglais, which was by now accepted as a regular member of the orchestra. Which, of course, brings us to *Tristan*. The Breitkopf und Härtel miniature score is quite clear (but I've not checked other editions): at the beginning of the first scene in the third act, it must be cor anglais and, because it's difficult to play, it must be the cor player from the orchestra. Partly because Wagner wants a different sound at the end of the scene and partly because he wants a cor in the orchestra right at the beginning of the next scene, at the end of the first scene, where the part is much simpler, it must either be another cor player, well doubled (ie quadrupled or worse) with other instruments, or a natural instrument of the alphorn type (ie with a trumpet mouthpiece). A wide variety of instruments has been cooked up to play the part, including the Heckelphone and other of Heckel's inventions such as the Heckelclarind (more or less a wooden saxophone) and another wooden saxophone, the Hungarian tárogáto (we have one in the Bate), has also been used. Forsyth's description of the

tárogáto as a holztrompete is badly confused; the holztrompete has also been used for Tristan, a wooden trumpet with one piston (Wagner's writing is wrong for a natural instrument; you need one valve to play it unless you are going to play right at the top of an alphorn's range, which is very risky), but this is not the tárogáto. Forsyth seems to be confusing the tárogáto, which has a saxophone mouthpiece, with the true holztrompete which has, the name implies, a trumpet mouthpiece. What it all really amounts to is that Wagner demands a cor at the beginning of the scene, or at least something that can play a pretty tricky part, and that he was happy with whatever fairly raucous instrument will sound most excited at the end of it. If the same instrument can be used at both points, well and good, but the beginning must not suffer from problems of melodic capability, tone quality, nor poor intonation. Apart from that episode, the cor has been well and extensively used ever since the middle of the nineteenth century, both for solos (Berlioz's *Symphonie Fantastique*, Dvořák's *New World*, César Franck's *Symphony*, Tschaikowsky's *Romeo and Juliet*, are just a few that spring to mind) and as an enrichment of the middle woodwind.

Both Berlioz's *Traité* and Forsyth's *Orchestration* are still useful texts on orchestration; the former is not only important historically but also gives a very good idea of what was available, what was used, and how it should be used, and the latter is very often a highly entertaining read.

The clarinet was radically improved by both father and son Sax, producing the basis of the simple system clarinet, the 13-key instrument which, modified by Albert of Brussels, was used in this country well into the twentieth century. It now had a key for every semitone, plus some trill keys. Similar work was done in Germany under the influence of the Russian virtuoso and teacher Iwan Müller, and his instruments became the basis of the German simple system which was analogous with, but different from, the Franco-Belgian. As a result, the instrument for which Weber's concertos were written was very different from that for which Mozart wrote, and, because the instrument continued to be improved, that of Brahms different again. The German simple systems were elaborated by Oskar Öhler to result in the modern German instrument, which is also used in Russia; the Franco-Belgian simple system was worked on by the player Klosé and the maker Buffet to produce the so-called Boehm system, which is used in Western Europe. The two sound different; the Öhler harder and straighter; the Boehm rounder and wider. The 'Boehm', incidentally, refers to the mechanism, which derives from the conical Boehm flute, of which Buffet was one of the licensed makers, not from any aspects of the acoustically perfected cylinder flute, nor from any work by Boehm himself. The main result of all this was an instrument which could play in any key with almost equal facility, to the extent that clarinets have been built with an E♭ extension to avoid the necessity for, and the expense of, an A clarinet; however, most players have stuck to using the pair,

partly to avoid transposing and partly because the A does sound rather warmer than the B♭. The great advantages of the clarinet are its warm, almost vocal tone colour, and its enormous range, going lower than the cor anglais and almost as high as the flute. This, for example, is why composers such as Weber used it so often to replace the soprano when incorporating an aria into an operatic overture.

Smaller sizes did not die out, particularly the E♭ and its orchestral counterpart in D. They tend to be a bit squeaky, though still powerful, which is why they were used for somewhat demoniac or mocking parts as in the Berlioz *Fantastique* or Strauss's *Till Eulenspiegel*. The bassethorn did more or less die out, though because nobody is going to neglect Mozart's music, modern instruments were made in all the nineteenth-century systems. Thus it was available for any composer who wanted its special tone colour. Similarly it was the revival of Bach's music by Mendelssohn that made the oboe d'amore available to anyone who wanted it, and indeed Strauss used it in the *Sinfonia Domestica*. The bass clarinet came into the orchestra from the military band, and was adopted, chiefly for opera scores, by Meyerbeer and of course by Wagner. Basically it was available in B♭, which didn't stop Wagner, or some later composers, asking for an A instrument. Very few players can afford two bass clarinets, so the answer is either to stick a roll of manuscript paper (or the next part off the desk) into the bell to give the extra length, which has the disadvantage that you then lack the bottom F written for A, or to produce extended

basses either with just an E♭ key or, more often because you never know what some idiot is going to write, with a full extension to the low C. These are strictly contrabassethorns but nobody is too worried about terminology. The lowest note of the ordinary B♭ bass is the written E on the first leger line below the bass stave, sounding a tone above the lowest note of the cello; the extended bass, if to written C, would be the A♭ a tone below the lowest note of the bassoon. Contrabass clarinets were available before the end of the nineteenth century, and were occasionally used in military bands, but they've not often been seen in the orchestra. I don't know why not; they have a very rich sound and speak just as easily as the treble instrument. They are widely used in the studios today, but then the music written for films and television jingles is the modern equivalent of the opera and military band in the introduction of new sonorities.

The bassoon in this period was split three ways: there was the old Viennese type, still very close in character and tone colour to the classical instrument, something which was true of the Viennese oboe also; there was the German instrument, developed by Almenräder and his associate, Heckel; and there was the French, developed by Triébert and Savary, which was used also in England. Just as with clarinets and with flutes as well as oboes, all three sounded differently and balanced differently against the orchestra as a whole, though of course fitting in well with the rest of the woodwind in the same tradition. One must remember that a woodwind choir for Brahms was a different sound concept from

that of Wagner, and that different again for Berlioz. This is one of our losses today, for there is a great tendency, encouraged by the jet-setting conductor who is recording in one country today, rehearsing in another tomorrow and giving a concert in a third yesterday, for everybody to sound as much the same as possible. For the first time there is an international concept of sound, which may be good in some respects (anything that a modern composer writes today will sound the same wherever it's played), but is a tragedy for the music of anything written before about 1950.

The German bassoon is fuller in sound than the French, but less interesting; the French is easier in the highest register (hence the opening of *Sacre du Printemps*) and with much more difference between the various registers and with more character in the sound.

The contra was now fairly regularly a member of the orchestra, and was always an octave below the ordinary bassoon. For tone, character and mechanism, it followed the various national schools of the normal size. Wagner, being Wagner, demanded a low A from the contra instead of the usual bottom note of B♭, and a special Wagner bell, a monstrous metal tube sweeping down towards the floor, is available to special order.

The brass showed the most change in this period. Valves were invented in Germany in 1815 and were pretty generally available, and beginning to be reasonably efficient, by the 1830s. They were invented initially for the horn, and allowed the players of that instrument to draw their hands further out of the bell be-

cause they could use the valves to produce the notes that used to be hand-stopped. This led to a very different tone colour, something that many critics inveighed against, but it also led to a much louder sound, something that players, conductors and audiences appreciated as the rest of the orchestra grew larger and therefore louder, and also to much greater certainty in the production of non-harmonic notes. They meant, too, that players no longer had to carry bundles of crooks around, and that composers could write fully chromatic parts, initially from written middle C upwards, when there were only two valves, and later over the full range from the C an octave lower. Brahms retained a liking for the handhorn, and wrote both his Trio and his orchestral parts for that instrument. Whether they were ever played on the handhorn is rather doubtful, but the style of the writing is clearly for the older instrument. Wagner was more systematic; he knew the virtues of both, and wrote accordingly. I cannot believe that he could only find two valve horn players for his early operas; I would rather assume that he wanted both tone qualities and that that is why he wrote for a pair of each.

Berlioz goes into great detail about the capabilities of the handhorn, including a mention of the factitious notes to which I referred a couple of weeks ago, the low notes which can be produced by slackening the lip (a good example of them, which he quotes, comes in Beethoven's *7th*, the low F♯ in the Trio of the Scherzo). He also suggests that one can avoid any dodgy hand-stopped notes by writing pairs in different crooks, which

was Brahms's normal practice — what one pair couldn't do, the other could. Berlioz himself often goes much further in this respect, writing for four horns each in a different crooking. He also emphasises the dramatic capabilities of the horn by using the different tone colours of open and stopped notes, something that we have lost today when everything is played on the valves, and indeed a loss that he complains of in his section on the valve horn. Not all 'improvements' are welcomed without reservations.

Trumpets were by this time available, according to Berlioz, in all keys from G down to A♭. They also had acquired valves by now though, as Berlioz says, the key trumpet was still used in Italy (he didn't think much of it, compared with the valve instrument, but as I think I said the other day, Verdi was writing for it in at least his earlier operas; some of those low-lying trumpet solos are obviously key-trumpet parts). Berlioz recognised in his own music the virtues of the natural instrument, and in particular the different characteristic tone colours, even more obvious with the trumpet than with the horn, of its different tube lengths when used in different crookings. If you look at his *Grande Messe des Morts*, at the wonderful trumpet entry in the 'Tuba Mirum', of the four brass bands, that in the north has four B♭ cornets (there wasn't a high B♭ trumpet then, and anyway he wanted a valved instrument); that in the east has two F trumpets and two in E♭; that in the west has four in E♭, and that in the south has four in B♭ basso, the same key as those in *Leonora 3*. Their tone qualities are quite distinct, and as they come in, one after the other, the

contrast of tone quality is enormously effective. Wagner achieved even greater effect with one of his strokes of genius that goes for nothing today. In *Lohengrin*, Act 3, Scene 3, (p. 697 in my Breitkopf miniature score) the nobs arrive. The first count has two E♭ trumpets; the second has two D trumpets; the third has two in F; the fourth has a pair in E (the timpanist is going a bit spare by now because he is in the orchestra and is doing some rapid tuning); and then the king appears with four (kings outrank counts) trumpets in C plus a large side drum. Then these trumpets all play together, and it works. We have played these passages on the natural trumpets in the right keys and it sounds fantastic; each has a quite different individual tone colour, and this magnificent piece of writing goes for absolutely nothing today when all twelve players are using the modern B♭ valve trumpets.

It is known that Berlioz rewrote a lot of his trumpet parts for cornet because he discovered that players were using cornets instead of trumpets because they were easier to play. Being a realist, he decided that if they were going to use cornets, they might just as well play music that suited the cornet, rather than playing trumpet parts that sounded tatty on the cornet (though his best cornet part, in the 'Scène du Bal' of the *Fantastique* is never played, not even in the recent Norrington recording). I would point out in this connexion that the modern B♭ trumpet is much nearer to a cornet in tone and character than it is to a real trumpet. On the whole, the only orchestral composers who wrote for cornet were the French, Bizet for example was another, but it was much

used in this country, too, for illegitimately playing trumpet parts. The French took it seriously, often choosing a crook whose tone would best suit the music; Berlioz often opted for the G crook, one of the longest of the set and one that sounded least vulgar.

The trombones changed little during this period (the trombone has changed less since the Renaissance than any other instrument). Valves were applied to it like every other brass instrument, but valve trombones sound so little like the real instrument that they have never caught on except where space is a real consideration, as in some opera pits, or where the slide trombone is unmanageable, on horseback or on a bicycle for example. It is really only in Italy that they have been widely used. Perhaps the most important change was the introduction of the contrabass trombone by Wagner; Wotan's spear, for example, requires it. Berlioz does not mention the contrabass (it was probably not invented by the time that he was writing) and says that basses were then pretty rare in France. He goes into some detail on pedal notes, which he used to great effect in the *Requiem*, and he does warn of the risks of writing carelessly for the instrument — notes which may be adjacent on paper can be a long way apart by slide so that some rapid passages which look easy can be quite impossible to play; that is one of the advantages of the valve trombone; you can write what you like with fair certainty that it will be playable, and the result has been a number of Italian parts which are almost impossible on the slide trombone.

Really major changes came in the brass basses. While various things like serpents and bass horns had been available, the serpent for a couple of centuries and the bass horn and other upright serpents from the end of the eighteenth century, none of them had been used in respectable music; only in military bands had they been heard. This was simply a reflection of musical taste; the bassoon gave a perfectly adequate bass for the orchestra of its time, and at a pinch the contra was around. Now, with the general thickening of sound, a heavier bass was needed. First the serpent was brought in, and then Halari's invention of a bass key-bugle (the key bugle was never an orchestral instrument, but again was used for military bands and quadrilles etc), the ophicléïde (ophicleide in English) which was easier to handle than the serpent and had a rather less woofy tone colour. Mendelssohn used both at various times, as did Wagner. Then Sax produced his family of saxhorns, from suraigu to bass, and Wieprecht in Berlin produced the first true bass tuba in F (the Zetsche in the Bate is identical with the Wieprecht model). These were adequate to start with, though nothing was really adequate for Wagner, and basses went basser and basser, winding up with unmanageable giants which are only seen on American football fields today, but leaving in the middle the contrabass tuba which is now our standard brass bass in BB♭, and sometimes in CC for orchestral use to save any transposing. The whole subject of brass basses is wildly confused because of differences of terminology in different countries. The one book that sorts them all out is Clifford Bevan's *The Tuba Family*.

Even Wagner got confused. He wanted a sound between that of the horns and that of the bass and contrabass tubas, and while initially he was thinking of saxhorns, eventually a new type of instrument, the Wagner Tuba was invented. These looked like German Tenortubas (our E♭ tenor and B♭ baritone) but were narrower in bore at the sharp end so that they would take a horn mouthpiece. They were built in two sizes, the smaller in unison with the B♭ alto horn and the lower with the normal F horn. The problem was how to write for them, and Wagner was inconsistent. In *Rheingold* and in part of *Götterdämmerung* he wrote for them as just described, but in the rest of *The Ring* he wrote for them as for two horns in E♭ and two in B♭ basso, and of course followed the old practice of writing parts in bass clef an octave low. They are not much used in this country, but they are commonly used in America today (under the name of Tubens) and I am not sure what convention is applied there. Bruckner used the first convention in his *7th Symphony*, with vast numbers of sharps and double sharps.

Timpani, as I said at the beginning, had become chromatic, though only in Germany were these readily available. Various methods were used, which I won't go into in detail, but it meant that pitch could be changed by a tone or a third with only a couple of crotchets rest. Not many composers took advantage of this, though I referred to one instance earlier in *Lohengrin*. Much more important was a change in the technology of making drumskins, which allowed them to be made much thinner. As a result the

old wooden sticks, which had been used satisfactorily on thickish skins, made a nasty rattling noise on the thinner skins, and Berlioz was one of the first composers to notice this and to specify the use of baguettes d'éponge, sponge sticks, the ancestors of our felt sticks. So in this period there was a major change of sonority in the timpani. There was also a change of playing technique, for sponge and felt sticks won't bounce clearly on a drum. As a result, composers stopped using the two notes on each drum in rapid alternation, so much used by Beethoven, and similar patterns, but changed to a much plainer form of writing, with more rolls and fewer rhythms (partly because the rhythm was less clear with soft sticks on thin skins than it had been with hard sticks on thick).

Other percussion instruments were coming in, bells (read Forsyth on 'Bells and Bell Imitations' for a good laugh about what happened at Bayreuth), xylophones and glockenspiels (eg Saint-Saëns *Carnival des Animaux*; when Saint-Saëns asked for Harmonica he did not mean mouthorgan, as Kostelanetz thought in his recording; he was using an older name for what we now call the glockenspiel), but on the whole, the orchestra remained fairly conventional in this area, with normally only bass drum (too often for Berlioz; his *Evenings in the Orchestra* are entertaining about this), cymbals, triangle and side drum. The real surge of percussion comes next week.

There is a lot of instruments I've left out for lack of time, such as saxophones, sarrusophones, flügelhorns, heckelphones (lots of instrument makers added -phones to their name), cornophones,

bass oboes and so on. I'll talk about them, as well as the extra percussion, next week.

— 8 —

Modern Times — The Age Of The Dinosaurs

We now come to modern times, what one might describe as the age of the jet-propelled dinosaurs, the post-Wagnerian epoch, where anything goes and the more the merrier. In my own end of the business, we call it 'jobs for the boys', and certainly when they put on *Turangalîla* or *Gurrelieder*, a lot of people earn a lot of extra money. It was, of course, one of the reasons for the creation of the small group movement, whether for *L'Histoire du Soldat* and other works after the first World War, or Britten's English Opera Group and his *Parable Operas* after the second. Partly it was a revulsion from the dinosaur orchestra, and partly, quite possibly chiefly, it was that a small group was financially viable where a full orchestra wasn't.

One of the interesting things about the dinosaur was the composers who managed to write chamber music for it. Where Bruckner, for example, was using it like a massive organ (he would simply pull the full orchestra stop, and there it all was), Mahler was using much the same band, sometimes bigger, and yet making it much of the time sound like chamber music. His scores are worth reading from that point of view. Of course some of the time he has the lot going at once, all hammer and tongs,

but a surprising amount of *Das Lied von der Erde*, for example, is very lightly scored. Perhaps that makes his scores seem all the more extravagant — I mean, why should he involve the orchestra in so much extra expense when he only wants the results here and there? But still, many of his scores are object lessons in how to write lightly for a massive band.

Still, let's go back a bit. I had originally entitled this session in my mind as The Borrowers, and I thought of it as that because this is when composers started looking at, or listening to the music of other cultures and importing ideas, themes and instruments from elsewhere. This wasn't wholly new. Haydn often took themes from the country round Esterházy, and Liszt was, of course, notorious, if that's the right word, for his *Hungarian Rhapsodies* and Chopin for his *Polonaises*, and if you look at Brahms carefully, you'll find a lot of aksak, the Turkish rhythm which Bartòk wrote out as 3+3+2 or 2+2+3. It was the French and the Russians who really started it, particularly with the Spanish mania, the *Habañera*, the *Capriccio Espagnol*, *España*, and so on, and with the Russian Central Asia thing which perhaps Tschaikowsky carried to the extreme with *Casse Noisette*. Where Couperin had portrayed *Les Nations* (which includes among the different nations *Les Femmes*) just with his harpsichord, our more recent friends not only went in for funny harmonies which they hoped would sound foreign, but also imported all sorts of funny instruments to make sure that it sounded foreign. The 'Danse Arabe' doesn't sound very Arab, but it certainly doesn't sound like Couperin.

Debussy of course was another; he heard a Javanese gamelan and went off and produced the whole-tone scale, which sounds nothing like slendro or pelog, the two Javanese scale systems, nor like the equiheptatonic scales you find in South East Asia, but again didn't sound like what people were used to. This sort of thing was carried to extremes between the wars when characters like Haba wrote in quarter tones and sixth tones — they even built quarter-tone pianos in Berlin at that period, and at least one survives in Cairo. Haba was the musical equivalent of the Dadaist movement in art, shocks for shocks sake. He was serious, at least I think he was, whereas Georges Antheil, who scored aeroplane engines, and Varèse, who wrote *Ionisation* for multiple percussion, were to a great extent, Antheil certainly, doing it to see what reaction they'd get from the critics and the public.

A lot of the new stuff coming in was percussion. Some of it was coming from light music, as some always has, the Latin American and the jazz instruments, some was made up as they went along (that's a bit more recent, the sons trouvés which led to and also grew out of musique concrète — if you can feed a door slamming into your tape recorder and then turn it into music by manipulating it electronically, you can also have someone slam the Green Room door in the concert hall, or run along a typewriter till you get the ping at the end of the row) but a lot of it was, and still is, though now from further away, the exotic instruments brought in from abroad. The first were the tambourine and the castanets. Bizet uses both tambourine (tambour de basque) and

tambourin (tambour provençal), and don't confuse them. Tambourine (de basque) is the small frame drum with the jingles all round; tambourin (de provence) is the deep tabor with a single snare on the batter head. De basque became accepted as a normal member of the percussion squad; de provence didn't. I think that Milhaud is about the only other composer who used it, in his *Suite Provençal*, though there is some argument for using it in Rameau (we did in *La Princesse de Navarre*; Rameau often wrote Tambourins as dance movements, but Navarre is part of the Basque country; I did try using the Basque equivalent, the string drum or tsountsounia, but it couldn't be heard over the rest of the orchestra). The castanets, which came into the orchestra at much the same time as the tambourine, never got naturalised; they always stayed Spanish, at least until very recently when anything goes; if one heard a tambourine in the orchestra it was just music, anyway until one had reason to say 'foreign colour', whereas at the first tick of a castanet one said 'Spain'. Similarly, though it's not classed as a percussion instrument, one says 'Hungary' (or maybe sometimes 'Romania') when one hears the characteristic sound of the cimbalom (though that didn't stop Strawinsky using it in *Les Noces*) — one trouble with the cimbalom until very recently was finding a player. Until John Leach, and now a few other players, took it up, about the only player in London was the chap in the Hungaria Restaurant, and he couldn't read music, which was a bit traumatic. Some conductors didn't worry too much what he played as long as it fitted, but the main problem was getting him

going and even more of a problem was stopping him. Johann Strauss cheated in *Tales from the Vienna Woods* by providing an ossia of a string quartet for the zither, but of course that's another localised sound, one that became very popular after the film of *The Third Man*.

Other instruments came in as colour or effect. I mentioned Saint-Saëns last week, with his xylophone for the rattle of dry bones. Things like thunder sheets, windmachines, and so on aren't really instruments, though they do turn up. Spurs (in *Die Fledermaus*), whips in *Mahler 5* and a number of other scores, including *Noye's Fludde* when Mrs slaps Mr in the face (that's a tricky one if she can't count, and no Mrs.Noah I've ever played it with could — either you do it when Britten wrote it, or you do it when she hits him, and in the first case the producer complains and in the second the conductor does). Britten cooked up all sorts of things for his operas, of course, or rather Jimmy Blades cooked them up for him, like the shuffle through the sand with pellets in a tube sliding from one end to the other, and then Britten asking for a heavier left foot than a right. I don't want to get embroiled too deeply into effects or we'll find ourselves running through the pantomime repertoire, with ratchets for whenever the comedian bends over and might split his pants, and the motor horn for Cinderella's coach (bulb horns are dangerous; the rubber perishes and they let you down; it's safer to blow them), but motor horns also appear in Gershwin's *American in Paris* and ratchets in Beethoven's *Battle Symphony* and quite a few other

works. I've blown a cuckoo in the wings in some Italian opera (but I can't remember which one), I've blown a nightingale in Malcolm Arnold's ballet *Sweeney Todd*, I've rattled chains in the Albert Hall for one of the Puccini operas (again I can't remember which; *Tosca* I think) and in Schönberg's *Gurrelieder*, and I've dropped them into a bucket in Litolff's overture *Robespierre* (that was the fall of the guillotine). Jimmy Blades and I made a tubular bell for my first *Cinderella* (at least once during a run one strikes thirteen to see if anyone notices), and of course tubular bells have been a frequent occurrence ever since what the Army bandmaster called one-eight-one-two. Quite often they are improvised; Puccini asks for almost impossible notes in *Tosca*, and cast-iron drainpipes have been used before now to get them low enough. A much better solution is bell plates, rectangular plates of steel, but the only good and complete set that I know of is in Amsterdam, at the Concertgebouw, and all that they can tell us is that they were made from scrap from a British battleship before the First World War.

Gongs have long been a problem. Strictly we distinguish between gongs and tamtams, the former being tuned and the latter untuned. The tamtam is the big Chinese disc, nowadays with a couple of Chinese characters on it (they are made in Switzerland), but they used to be genuine Chinese till all the ones brought back as loot from the Boxer Rebellion wore out; the BBC lost theirs when Alfie Dukes put a bell hammer through it. This is one of the dangers of composers who don't know how to handle instru-

ments; they often ask us to play them with inappropriate things; Elgar asks for a cymbal struck with a heavy iron rod in the *Enigma* — not my cymbal; I'll hit his like that if he likes. Various composers ask fiddlers to tap their bows on the back of their violins — so good for a £20,000 bow on the varnish of a £900,000 Strad; even col legno, the wood of the bow on the string, is unpopular with fiddlers, and they usually cheat by using mostly hair. Back to gongs. Tschaikowsky, in the *2nd* and the *Pathétique*, was one of the first to ask for one. The problem with gongs is that they are tuned. If you can afford to get a set like those made for *Turandot*, you're OK, but that's not cheap and at one stage, at least, it wasn't possible to put on Vaughan-Williams's *Sinfonia Antarctica* and *Turandot* in the same week because the Garden wouldn't lend out their gongs, which used to be the only set in this country; the same thing used to happen with *The Ring* and Bruckner's *7th* or *Sacre*, when the Garden had the only set of Wagner tubas, but there are more of these things around now. The trouble arises with people like Messiaen who ask for a handful of gongs without specifying pitches, and we all bring a few along and make up whatever seems the best set between us. The thing is that all these gongs are pitched, most of them to notes that don't belong in our scales, and to our ears they clash with the music. However, the composers don't seem to mind about this, though I for one don't understand why not; 'it's just an effect' they say, but I wonder whether they'd be equally casual about notes on other instruments; perhaps they would; at least one composer I played

for was. The same thing happens with slit drums (log drums they are sometimes called); they're all pitched, too, and there we are banging away on some New Guinea or Central African scales in the middle of a piece of European music and no one seems to mind except us.

Still, let's get back a bit into the main stream and see what happened to the standard instruments, as usual in this series. First the strings. Numbers increased even more than last week. Starting at the bottom, all basses now have four strings, and some either have a fifth or have an extension on the top of the E string so that it can go down to C. I think that the usual practice is to tune to C as the lowest note, rather than continuing the series of fourths down to B. I haven't mentioned bass bows before, but there is a difference between the French bow, which is handled like a cello bow, and the German bow which is handled more like a viol bow, with the palm upwards. The former gives you a bit more dig in, the latter has a slightly better tone quality, especially for chamber ensembles. On the whole we use the French bow here, but there are always a few people who appreciate good tone, and in most orchestras you can see one or two using the German bow.

Every serious orchestra has at least one or two 5-string basses or extended 4-stringers so that it is always possible to play the Mahler and other parts which require the low C, and as a result, there is always the danger that I've referred to before of a permanent 16-foot bass line which may or may not have been required

in the eighteenth and early nineteenth centuries. What the extra tension is doing to the instruments is another matter.

Violins haven't shown a lot of change except in string materials which is common to all the strings and which I'll come back to shortly. The violas have suffered from the growing strength of the other instruments. The big tenor viola, which I described in our first session, and which you can see in the Ashmolean, is a fairly thin instrument from belly to back, but very long from top to bottom. It makes a beautiful sound but it's hell to handle unless you have very long arms; Max Gilbert, who played one, used to spend a fortune with osteopaths. Tertis, who was a fairly small man, designed a new model which Richardson and others made for him. It was quite small from end to end, to make it easier to handle, and to compensate for the lack of resonating air mass, it was very deep from belly to back. The result was that it sounds very tubby and quite unlike a true viola. They were quite fashionable at one time, but they seem to be used rather less often now.

There was no physical change to the violin, but the string materials changed again. First came the wire E, which I've already described, and this was followed by all steel strings, which sound filthy but which project more than the older materials, last longer, stay in tune better, and are fine for everybody but the composer, and he's usually dead and so can't complain. These strings are of course made for the whole family and affect all the instruments. Silk strings, called acribelles, were used at the end of the last

century, but their name was fairly appropriate and the sound was fairly acrid, and they were mostly used by players in tropical climates, where they seem to have lasted better than gut. The same applied to woodwind instruments made of vulcanite and ebonite, materials which are now only used for cheap instruments for children and amateurs, but which were a godsend in the days of the Empire and when all ships had orchestras and used to have to go on playing while sailing down the Red Sea and other places where wood cracks and glues melt. Nylon bowhair has been tried, incidentally, but serious players won't use it; it hasn't the response of horsehair and they prefer to go on paying through the nose for a rehair once a week or so. A busy professional has at least three bows, one in use, one spare, and one being rehaired.

Perhaps I should mention the New Violin Family. This is the invention of Carleen Hutchins and the Catgut Acoustical Society. The idea is to have a set of instruments, all of which match the acoustical characteristics of the violin for the sake of homogeneity of sound, in some ways a return to the renaissance ideal of whole families. There is a treble violin, then the normal instrument, then a tenor rather larger than a viola and played downwards on a tailspike, then a baritone which is a big cello, then a bass, partway between cello and the usual bass, much like the old chamber bass like the one upstairs in the Bate, and then the true double bass which isn't quite as big as Vuillaume's Octobasse but is quite a bit larger than the ordinary double bass. Of course these can only be properly used in music written for them because you can't stop

and put down the violin and pick up the treble when you go above top C or wherever and anyway the whole idea is misconceived. The whole point of something like the string quartet is that you have three quite different tone colours which nevertheless match and blend with each other, whereas if you have four members of the New Violin Family, they are all going to sound the same with a very dull result, just as if you imitated the whole lot by recording a violin on the Fairlight and then electronically creating your viola and cello from that.

Which brings us to the electronics, which I hadn't really intended to talk about but which are indisputably part of the orchestra of today. I was going to leave them out partly because I don't know much about them, and partly because I don't much like them. My chief objection to them is when people say that you can't tell the difference between whatever they are trying to imitate electronically and the real thing. Maybe they can't but I can, and I'd reckon that anyone without cloth ears can. Where they succeed is when they make their own sounds, which can of course be fascinating and useful. This started with Lev Terman, whose instrument, the Thérémin, used one hand to control volume and the other, moving towards or away from a contact, controlling pitch. Very roughly it's a controlled capacitance howl. It's an interesting sound, but it gets dull after a while because there is no change of tone and everything moves by glissando. Similar in some respects but much more sophisticated is the Ondes Martenot. Because that can be played from a keyboard as well as

from the ruban, it is not confined to glissandi and because it uses a gong as part of the resonating apparatus, it has much more character in its tone. Its chief exponent has been Messiaen because he married one of its leading players. In this country it mainly turns up in the studios. The rest of the stuff I'll leave to Dr.Sherlaw-Johnson, who knows far more about them than I do, but again on the whole we see more of them in the studios than we do in the concert hall, partly perhaps because a lot of the concert hall music that uses them only gets heard once.

So to the wind. The basic woodwind instruments haven't changed a lot. As I said a few weeks back, we're now all on tin flutes and piccs though you still see a wooden picc occasionally (it's a bit less piercing). The bass flute came in with the Ravel-Debussy school. The instrument that we call, in this context, the bass flute is in fact the alto, with a lowest note of G — it is a transposing instrument and it sounds a fourth lower than written. It is a bit of a cow to write for because, obviously, it is most useful at the bottom of its range, that part below the normal flute, and this is where it is least audible and most easily drowned by other instruments. It's also tricky because while the French had the sense to call it Flûte en Sol as a rule, some English composers, Holst for example, called it bass flute and now that a few players really are playing a bass flute an octave below the normal instrument, there can be confusion. Where both the G alto and the octave bass are really useful again is in the studios where they can be miked up to give an effective balance. A lot of studio work is done with a

mike for each instrument and a 16 or more track recorder (you can get 32 good tracks on two inch tape) and this has led to a lot of interesting sounds. I remember one thing we did for Ron Grainer with mediæval instruments and so forth, and he included clavichord, harpsichord and piano, all miked to the same loudness — very effective it was.

Oboes. Again the normal instrument is much as it was last week, with a few more keys and a bit more facility. The Boehm oboe has been tried, but it's a bit coarse in sound and not very popular. A compromise that has been slightly more popular is a conventional upper joint and Boehm lower joint. The cor has gone from strength to strength and is now pretty well a standard instrument. The bass oboe (Triébert called it Hautbois baryton) has been used by a few composers (Holst scores it in *The Planets*) and the Heckelphone by rather more (Strauss uses it quite a lot). The snag is that players usually have either the one or the other and that no orchestra is going to hire in a heckelphone player if it has a bass oboe player on the strength, nor vice versâ. Since the heckelphone is a great deal louder than the bass oboe, this can lead to balance and tonal problems.

Clarinets, like the oboe, have changed a bit but not too much. The bass clarinet is used more often than it was, and in the studios the subbasses are more and more common, though still not often heard in the orchestra.

An instrument that really belonged in last week's session is the saxophone, which Berlioz described in glowing terms but which

I'm not sure he ever used. Sax said in the patent that he'd invented it to add string tone to the military band, and it was one of the main reasons that a gaggle of French composers went to Brussels to persuade him to move to Paris. He made a double set, one in E♭ and B♭ for the band, from sopranino down to contrabass, and a parallel set in F and C for the orchestra. The F & C set hasn't been used much, apart from the C melody tenor which was widely used in dance bands and salon orchestras (very useful for cello parts), and on the whole the saxophone itself hasn't been used much outside France for orchestral music; it is of course a light music instrument in all sorts of combinations, and it's also a standard military band and wind band instrument. This lack of use in serious music is partly because of the dance band use with its wide vibrato, which puts the serious composer off except in special cases like the Vaughan Williams *Job* where it represents the hypocritical comforters. There is a lot of good French chamber music for it which can sound well when played without vibrato, unless you like the French habit of adding vibrato to almost everything. Bizet wrote a very effective solo for it in *L'Arlésienne*, and Ravel in *Boléro* wrote for several sizes.

Bassoons have shown more change in the last decade because whereas before the war we had French bassoons here and in France and German in Germany, now the German bassoon has taken over everywhere, even in France. Again, in the middle of the last century the Boehm system was tried on the bassoon, both here and in France; it was a total failure because it was too suc-

cessful. The tone was so even all over the compass that it didn't sound like a bassoon any more. The change to the German instrument is again a matter of balance and tone colour, probably affecting the French romantic composers more than anyone else. As I said last week, the French bassoon is easier in the high register than the German, but players have simply had to learn how to cope with parts that were written with the French instrument in mind, just as in the nineteenth century they had to learn to cope with the difficulties of playing clarinets with the reed on the lower side of the mouthpiece for the sake of the advantages of having it that way up for tone quality and being able to get a tongued staccato.

Like last week, there has been more change in the brass. The German horn has taken over everywhere, and this does make a very big difference to the balance of the orchestra. It is much louder and much coarser in sound than the old French horn, and it can often sound like a young euphonium. Hand position makes a difference too. The Italians play with their hands right out of the bell, gripping the bell rim, which makes a much brighter, harsher sound than you'd hear here, but perhaps that was what Dallapiccola and Respighi were writing for. The Americans hold the thing with the bell resting on the thigh and pointing into the tummy, which gives a very tubby sound, which we think very nasty, but again perhaps that's what Copland and others balanced for. Because the double horn in various pitches is now normal,

composers have much less hesitation in writing very high parts than they used to.

I haven't spoken about muting with any instruments, though most have used mutes at one time or another, even the woodwind; we have a couple of early nineteenth-century oboe mutes in the Bate, and mutes on strings go back to the eighteenth century. Horn muting is a special subject though. It can be done with a mute if there is time to put one in and take it out again, but it can also be done with the hand. Handmuting has a different tone quality from a separate mute (it also alters the pitch, but that's the player's worry, except in a piece like the Britten *Serenade*, where the composer takes advantage of it). There is also handstopping, + or gestopft or cuivré as distinct from sons bouchés. This is fully handstopping and giving a strong push from the diaphragm; the result is a sharp brassy sound and a jump up in pitch. This was also an effect that Beethoven and others used in the handhorn days and which has been neglected since; an 11th partial (written F or F♯ on the top line) plus a sforzando produces that cuivré effect automatically because that note has to be well stopped to get it in tune. The main problem is that handmuting in this way is not very effective below middle C written for F horn, and gets more and more difficult to do with any decent tone quality the lower you go. As a result some of the Ravel parts are very awkward to bring off, and where there is time to get them in and out, players use a special small transposing mute of metal which gives something fairly close to the sound of the hand.

Trumpets have, of course, got smaller and smaller. Nobody uses anything bigger than the B♭, which can't even play the bottom notes of the old F trumpet parts, and many use C trumpets most of the time and the little D and smaller whenever the parts get high. The bass trumpet has been asked for by Wagner and others from time to time, though it's not a very successful instrument, and nobody as far as I know has ever built one as bass as Wagner seemed to want. Usually today they are in E♭ a tone below the old F trumpet but wider in bore. The modern B♭ trumpet is very close to the cornet, the only real difference being about 1/16 of an inch in the diameter of the mouthpipe and a different mouthpiece and, usually, a rather different tradition in tone production (I say usually because one professional trumpeter I know swears blind that both should sound as much the same as possible; as a result, when orchestras go to the trouble of getting both cornets and trumpets for a Berlioz work, quite often they both sound much the same; the only solution is to get some brass band cornet players in, and then you'd get something like the contrast that Berlioz was after). In Germany, they still, in the better orchestras, use the rotary valve instrument they call the Orchester-Trompete as distinct from what we use, which they call the Jazz-Trompete. Verdi, by the way, asked for a special trumpet in B natural with one piston for Aida but nobody much else has used it.

Trombones have rather gone to the dogs, with everybody now using duplex instruments with a plug in the back bore so that they are both tenor and bass. They are also wider bore

and duller sounding than the old French and English narrow-bore peashooter, which had a real snap to the sound. But I think I've mentioned all that before.

Tubas haven't changed much, and we occasionally see the smaller members of the family such as the flügelhorn. Problems arise with the tenor tuba, which gets asked for from time to time. Does the composer mean the tenor Wagner tuba, or does he mean the true tenor tuba? The answer is often either word-of-mouth, tradition, or guesswork. For Holst in *The Planets*, the answer is the English baritone (the euphonium is a bit too heavy, though it could be used).

Various keyboard instruments turn up now and then, of which the most important is the piano, which I don't need to talk about except when composers expect drummers to climb into it and bash the strings with drum sticks, or have it strewn with drawing pins, chains and so on; neither practice is much appreciated by the owners of the instrument, and even less liked by the tuner who has to repair the damage. The next most important is the celeste, an instrument with metal plates over resonance boxes with a very sweet sound, appropriate for 'The Dance of the Sugar-Plum Fairy'.

Finally, back to the percussion. Timps are now fully chromatic, but this does not mean that composers should write tunes on the things. The main problem is knowing what pitch one has reached; if the composer expects the player to tune one drum while playing another, the pitch reached is going to be guess-

work, usually surprisingly accurate because, on one's own drums, one does often know just how much to push or lift the pedal for a certain distance in pitch, but one can never be sure. The drums do have gauges, but they aren't very accurate and it's difficult to read the music, watch the conductor, and look at the gauge, all at the same time. The best example of how to write for pedal timps is Britten's *Nocturne* in which one never moves a drum except when one is playing it; when one moves to the other drum, one always picks up at the pitch that one left it on. Some composers have an exaggerated idea of the range of timps. Mahler writes low D and C, which can only be effective on a 32″ or 34″ drum (the usual pair are 24″ and 27″); even Reger's low E, or is it E♭, in the *Mozart Variations* is out of the range of a 27″. High G is not uncommon (eg *Russlan & Ludmilla*, now a very fashionable piece to see who can play it fastest instead of best) which requires a 22″, and even higher notes are sometimes seen (Jimmy Blades had to get a special drum made for the top part in *The Turn of the Screw*). Any big orchestra has to be able to produce these, of course, nowadays.

The routine percussion haven't changed much, bass drums, cymbals, triangle, and side drum, other than the changes I mentioned a few weeks back and the effects of plastic 'skin' which sounds pretty lousy on bass drum and tambourine; it smacks rather than booms, but it's easier for mikes to pick up without distortion so it's bound to be popular with the chaps who pay the bills, the Beeb and the record companies. Side drum snares,

made of spirals of spring wire instead of gut or wire on gut or silk, now rustle and buzz instead of snapping; no harm from the player's point of view because rolls are now much easier than they used to be, but less exciting for the listener, and parts which require a rhythm are now often blurred instead of being pin-sharp. The opening of *Bolero* is much easier than it used to be; it was very difficult to get a pianissimo and still hear a fraction of snare sound instead of a dull thud with the old snares, but it's quite easy now. The trick used to be to use two side drums, and start on an upside-down drum, whose snares reacted much more effectively, and switch over when one got up to mezzoforte or forte.

The tuned percussion have come in much more generally in the last 50 years or so, xylophone, marimba, glockenspiel and vibes. Glocks were often played from a keyboard in the early years of the twentieth century, a very inefficient little machine with no dynamic range, not much compass and an action which had a habit of jamming or sticking. Dukàs wrote *L'Apprenti Sorcier* for one, but nowadays players' technique has progressed so far that it's always played on the hammer glock. When I started in the 50s, players always complained if they'd not been warned what was on the programme and given a chance to practice (only Jimmy Blades, Steve Whitaker and Freddie Harmer, of all the London players, could sightread on the instruments). Now standards have improved so much that any drummer is expected to be able to sightread anything that's put before them. There is a problem with range; none of these instruments has a standard

size, and the parts often have to be put up or down an octave to fit them to the instrument. We used to have fun with vibes, which have a motor to turn the fans to add the vibrato. They used to be clockwork, and of course always ran down in the middle of a passage, unless the composer allowed for this and provided rests at reasonable intervals; otherwise the player, cursing, had to play with one hand while turning the crank to wind it up again. Then we got electric motors, and in those days some halls were still on DC, which led to clouds of smoke and more profanity as the AC motor burnt out. Still, there's no problem nowadays with such things.

The only real difficulty is with parsimonious managements who would never ask one chap to play violin with one hand and viola with the other, but who do expect it from the kitchen. The Royal Ballet used to tour (maybe they still do) just a timpanist and expect him to play what a timpanist and five percussion players played at the Garden. Even at the Proms with the BBC Symphony I've found myself playing maracas and claves at the same time, which is tricky because the maracas rattle when one plays the claves if you're holding both. The trickiest in that respect is the sleigh bells; rhythms like Holst writes in *The Perfect Fool* are very difficult to bring off without extra random jinglings.

Enough's enough; come and ask me [email me] if you have any problems.

Bibliography

READING LIST

Short reference, with some comments

First and foremost, the scores - these are the only real evidence we have of what instruments people wrote for, their ranges and, often, their numbers.

Then books on orchestration, eg:

Hector Berlioz	*Traité d'Instrumentation*, by far the most important
Norman Del Mar	*Anatomy of the Orchestra*, first rate except on exotica and 'early instruments', where it's often wildly inaccurate.
Cecil Forsyth	*Orchestration*, often entertaining and a good read. Inaccurate on out-of-date historical instruments (eg serpent) but otherwise excellent.
John Marsh	'Advice to Young Composers' (*Galpin Society Journal* 18, 1965)

and many others.

Then books on the History of Orchestration such as several by Adam Carse (he illustrates a number of seating plans, which are useful, and cites some pay-sheets etc which give us fairly precise numbers of different orchestras at different times and places).

The best evidence is still the scores, especially with reference to when they were written and for what orchestra. Eg compare Bach's orchestration for Brandenburg with that for Cöthen and Leipzig; Mozart's orchestration for the concert hall in Vienna and in Paris; and for the opera houses in Vienna and in Prague; compare Haydn's and Mozart's orchestration for Paris; compare Haydn's orchestration for Vienna and London; compare Beethoven's orchestra in the 1790s with that in the 1820s; compare Wagner's early operas and the Ring; and so forth. Not till this century did composers write for anything other than a specific orchestra, and for that matter compare Stravinsky's orchestration for Diaghelev with that for other commissions.

Then there are numerous books on the history of instruments, for which see the bibliographies of my other lecture series (ask me for them if you've not already got them); there are far too many to list here, though you could start on my own (*The World of Baroque & Classical Musical Instruments* and *The World of Romantic & Modern Musical Instruments*; both are in the Faculty Library and the second is on sale in the Bate, half price to you). There are also *Bate Guides and Handbooks* on each family of instruments, and one on *Instruments of the Baroque*, all of which are available to you at half price.

SCORES CITED (except in passing)

Bach	*B minor Mass*
	The Brandenburg Concertos
	F major Clavier Concerto
Beethoven	*Fidelio*
	4th Symphony
	7th Symphony
	8th Symphony
	9th Symphony
	Wellingtons Sieg oder die Schlacht bei Vittoria
Berlioz	*Grande Messe des Morts*
	The Trojans
	Symphonie Fantastique
Bizet	*L'Arlésienne*
Britten	*Nocturne*
	Noye's Fludde
Corelli	*Violin Sonatas*
Haydn	*Symphony no.22, The Philosopher*
	Symphony no.100
Michael Haydn	*Turkish Suite*
Lulli	*Les Plaisirs de l'Isle Enchanté*
Monteverdi	*L'Orfeo*
Mozart	*Il Seraglio*
Schubert	*Auf dem Strom*
Strawinsky	*Le Sacre du Printemps*

Telemann	*Methodische Sonaten*
Tschaikowsky	*Casse Noisette*
Wagner	*Lohengrin*
	Tristan und Isolde

BOOKS CITED

Bate Handbook	*Tuning and Temperaments and why we do it*
Clifford Bevan	*The Tuba Family*
Hector Berlioz	*Evenings in the Orchestra*
David Boyden	*History of Violin Playing*
François Couperin	*L'Art de Toucher le Clavecin*
Peter Holman	*Four and Twenty Fiddlers; the Violin at the English Court*
Hotteterre le Romain	*Principes de la Flûte Traversiere*
Marin Mersenne	*Harmonie Universelle*, 1636
Michael Prætorius	*Syntagma Musicum*, 1619
Johann Quantz	*On Playing the Flute*
Felix Weingartner	*On The Performance of Beethoven's Symphonies*