Instrumentation and orchestration.

The art of combining the sounds of a complex of instruments (an orchestra or other ensemble) to form a satisfactory blend and balance. The term ‘orchestration’ is often used to denote the craft of writing idiomatically for these instruments. ‘To orchestrate’ has also come to mean to score for orchestra a work written for a solo instrument or small ensemble. There have been many attempts to differentiate the terms ‘orchestration’ and ‘instrumentation’ since Berlioz juxtaposed the two in the title of his *Grand traité d’instrumentation et d’orchestration modernes* (Paris, 1843); in this context the two terms should be considered as inseparable aspects of a single musical concept. Instrumentation by itself is a more general term, denoting the selection of instruments for a musical composition, either as part of the composer’s art or by the performers for a particular performance.

See Orchestra; *see also* Arrangement. For a discussion of rock band instrumentation, *see* Band (i), §VI.

1. Middle Ages and Renaissance.

Orchestration is a difficult concept to apply to medieval and Renaissance music, if only because there was no ensemble that corresponded to the modern orchestra, and because composers almost never (except in the case of specialized notations such as lute tablatures) specified their intended instrumentations. The usual modern sense of the term, to mean the exploitation of different instrumental colours for their symbolic meanings and aesthetic effects, seems to have been foreign to most of the period. Yet even in the Middle Ages there were stereotyped instrumentations – each with its own developing, diverging practical tradition and symbolical associations – in which can be seen the basis of many of the later principles of orchestration.

From the Middle Ages through the 15th century, three types of instrumental ensemble predominated in Europe. The trumpet band (trumpets and kettledrums) was used for signalling (*see* Signal (i)) and ceremonies (*see* Festival, §2): it had a high prestige but, because of the limitations of the natural trumpet, a restricted musical usefulness. Soft or *bas* ensembles, consisting of a variety of bowed and plucked strings, woodwinds, portative organs, and so on, were used for indoor dancing and background music; such was the association of these instruments with secular activities that they were often prohibited in church (although, paradoxically, it is soft instruments that are most often depicted in angel-concert paintings). The loud band (*haut musique* or *alta*; *see* Alta (i)) of shawms, later with slide trumpets or trombones, was used for dancing, processions and other outdoor music, and its symbolic associations were somewhere between the other two: loud bands seldom appear in angel-concert paintings, but because of their ceremonial history, they were the first type of ensemble allowed in church. There is relatively little evidence before 1500 for voices and instruments regularly performing together on composed polyphony; when it happened, the instruments were usually those of the loud band for church music, and the lute and/or harp for secular songs.

In the 16th century these categories persisted, but they became increasingly blurred as instrumental music developed as an amateur pursuit, and as instruments that were equally at home in loud and soft music, such as the cornett and the dulcian, became more widely used. The 16th century also saw the rise of families of instruments, identical except for size and therefore pitch (e.g. viols or recorders) that could be played together as a homogeneous consort. In some cases where the highest or lowest members of the family were impractical, the standard consort used a substitution (the trombone family, for example, was completed by cornetts in the treble). The *a cappella* choir, which dominated both church polyphony and secular song for the entire Renaissance, probably should be considered the archetype for all instrumental consorts. The consort ideal governed or influenced most of the known instrumentations of the 16th century, including the largest ensembles, such as the famous band of S Marco, Venice, under the Gabrielis (essentially a redoubling and expansion of the standard cornett-and-trombone ensemble), and those accompanying the Florentine *intermedii* (which consisted of combinations of various instrumental family groups). Recorded instrumentations that combine instruments promiscuously are rare (but *see* Consort for a discussion of the English mixed consort of the late 16th century and the 17th).

Professional instrumentalists of the Middle Ages and Renaissance were trained to play many instruments, and they were routinely called upon to switch several times over the course of a performance. The best ensembles and their directors thus had considerable flexibility of instrumentation, and in some cases, notably the *intermedii* orchestras, they worked this flexibility to magnificent effect. However, their criteria for choosing one instrumentation over another remain largely unclear. The richest testimony to the late-Renaissance director's thought processes is probably the third volume (1618) of Praetorius's *Syntagma musicum*, with its long and detailed instructions on how to combine the different families of instruments with voices in concerted sacred music; yet the advice always centres on practical concerns (range, loudness, comfortable keys, the ability to play more than one note at a time) and never on the aesthetic motives behind any choice of instrumentation.

Throughout the 16th century there are at least hints that certain instrumental colours were being used for symbolic effect: *intermedii* orchestras, for example, often used trombones to accompany Olympian and infernal scenes, reeds for shepherd scenes, trumpets for battle scenes, etc. But the influence of this kind of thinking outside theatrical music should probably not be overestimated; for most working ensembles, matters of tradition and practicality were paramount. The old distinction of *haut* and *bas*, the ideal of the matched consort, the grandeur to be achieved by multiplying and combining families and adding chordal instruments such as organs and lutes, and the strengths and weaknesses of the individual instruments: some combination of these factors is sufficient to explain most of the normal instrumentations of the late Renaissance. And even to the end of the period and in the most distinguished ensembles, the desire for simple variety should not be discounted as a motivation: in 1586, for instance, Francisco Guerrero ordered the cathedral band of Seville to play their three verses of the *Salve regina* with shawms, cornetts and recorders, 'for having them always on the same instrument is annoying'.

Kenneth Kreitner

2. Baroque orchestration.

The evolution of orchestration in the Baroque era was closely related to four musical developments: the establishment of new, large-scale forms in which instrumental groups functioned as the accompaniment for vocalists (opera, oratorio, etc.); the adaptation of the concertato principle for ensembles including soloists (concerto types, suites, etc.); the unprecedented improvement and growth in instrument making during the 17th century (strings in Italy, woodwinds in France); and the acceptance of keyboard instruments as regular members of orchestras where they were entrusted with the harmonic support of the repertory.

Opera became the leading stimulus in the transformation of the earlier consort-based instrumentation into a gradually standardized mixed ensemble of strings, woodwinds, brass (with percussion) and continuo. In 17th-century Italy lavishly orchestrated court presentations and public opera houses with modest accompanying ensembles flourished side by side. Instrumental settings of court operas were governed by a number of factors: the type of occasion (indoor or outdoor), the size of the hall, the availability of players, and the content of the libretto. The latter had considerable influence on developing stereotypes in orchestration.

The symbolic usages of the *intermedii* ensembles discussed in §1, above, continued to be employed. For *L'Orfeo* (1607), Monteverdi specified 42 individual instruments grouped in three categories: strings (10 *viole da brazzo*, 2 *violini piccoli alla Francese*, 2 *contra bassi da viole*); the *fundamenti* (continuo section: 2 harpsichords, 1 double harp, 3 *chitarroni*, 2 ceteroni, 2 *organi di legno*, 2 regals, 1 *basso de viola da brazzo*); and winds (1 *flautino all vigesima secondo*; 2 flautini, 2 cornetti, 1 *clarino con quatro trombe sordine*, 5 trombones. The presence of the *trombe sordini* (muted trumpets) suggests that timpani would also have been used (as constituents of the contemporary trumpet band). His fascinating orchestration fused the late Renaissance tradition used in *intermedii* and *pastorales* and the new concertato style (e.g. 'Possente spirto') with the Venetian *cori spezzati* principle, creating a uniquely colourful style of instrumentation for the ritornellos and sinfonias. Among the great variety of court operas produced before 1670, it seems that Roman and Florentine composers such as Filippo Vitali, Stefano Landi, Caccini, and Antonio Cesti – whose *Il pomo d'oro* (Vienna, 1668) utilized the largest recorded court orchestra – were the most inspired by Monteverdi's orchestral innovations. By way of contrast, Venetian public opera houses (where interest was focussed on the virtuosity of the singers and the ingenuity of the machines) tended to employ much smaller ensembles, typically comprising a small string orchestra with a continuo of two or three plucked string instruments and keyboards, with the occasional addition of recorders and other wind instruments. Contemporary printed librettos indicate the use of individual instruments for special effects both on and off the stage.

As the century progressed there was a general change in scoring. The distinction between the use of continuo accompaniment for the voice and of orchestral ritornellos to fill in the interludes between stanzas gradually disappeared after 1650. The orchestra began to participate in the arias, adding imitative exchange, echoes or embellished melodic lines. An ensemble of three (2 violins and continuo) or five parts (2 violins, 2 violas and continuo) became standard. During the last three decades of the century, composers introduced solo wind parts in arias, as well as the concerto style with various obbligato instruments. The trumpet became increasingly popular, and began to appear regularly as a member of the orchestra, in addition to its customary use for special effects on and off the stage. Trumpets were used either in opening sinfonias set usually for two trumpets and five-part strings, or in arias written for solo voice and trumpet(s) with continuo accompaniment. In the sinfonias the winds alternate with the strings in concertato manner, except in the opening and closing bars where they all play together. The arias mostly use solo voice, solo trumpet and continuo for the A section of the Da Capo form, contrasted often with a string accompaniment for the middle section.

The orchestration of oratorios and cantatas was less uniform. During the first half of the 17th century instrumental scoring for sacred and secular vocal music tended to be based on the availability of players. Monteverdi's late madrigals sometimes require two to four string parts with basso continuo; in *Il combattimento di Tancredi e Clorinda* (1624) he uses pizzicato and measured tremolo to express the dramatic nature of the text. In the mid-17th century, a three-part setting (two upper parts and basso continuo) became the standard formula for accompanying larger vocal works. For short cantatas and other brief vocal pieces composers selected freely from the instruments available. All types of orchestration were affected by the gradual transformation of the older polychoral setting of church music into the concerto style, in which a small solo group (concertino) competed with the larger tutti (ripieno) ensemble.

A remarkable exploration of methods of orchestration took place in Rome at the turn of the century. A small chamber band comprising four violins, two violas, cello, double bass and keyboard, was regularly employed by Cardinal Ottoboni to perform concertos for entertainment, and also to accompany opera, oratorios and cantatas, all under the direction of Corelli. For special occasions they became part of a greatly extended 'festival' ensemble comprising 33 strings with harpsichord, and occasionally a few winds (trumpets, oboes and bassoons). An example of this flexibility in scoring is Lanciani's *Amore e Gratitudine* (1690–91) which was given ten times at the palace; of these, eight performances used the regular chamber orchestra, but the remaining two were supported by the 40-member 'festival' band without basic alterations in the music. Nevertheless, the 'tutti' and 'soli' indications for accompanied arias in the manuscript score suggest an orchestral division into concertino and concerto grosso groups. It seems that the practice of orchestral subdivision was customary in Corelli's orchestra beyond purely instrumental works. In the manuscript of G.L. Lulier's serenata *Gloria, Roma, Valor* (1700), also prepared for Ottoboni's musical establishment, the score indicates the individual concertino lines above the ripieno parts.

Rome was also the venue of Alessandro Scarlatti's mature musical output. Oboes, bassoons, trumpets and a four-part string group constitute the instrumental basis for his orchestration. In his orchestras after 1710 a standard string ensemble provides the accompaniment for the vocal solos; winds – in varied combinations – either take obbligato parts in arias or double the string parts in tutti writing. There are numerous special orchestral effects; e.g. a march in *Tigrane* where 'the oboes and bassoons play on stage, the violins in the pit in unison'; Policar's aria (with string support) in the same opera features an obbligato viola d'amore part; 'violoncello e leuto' make up the concertino with unison violins and continuo as the ripieno in an aria for Tigrane. As continuo arias gradually disappeared from Scarlatti's stage works, accompanied recitatives took over the dramatically charged scenes. The exchange between the vocalists and the chordal-melodic punctuation in the strings provided the model for accompagnato settings throughout the 18th century. Concerted accompaniments were also frequent in his oratorios, where the composer often employed string ensemble with a concertino of one or two solo violins against a concerto grosso or ripieno set for two violins, two violas and basso continuo.

The principle of contrast regulated the orchestration in Baroque concerto forms. Such contrast could be limited to placing the four-part string tutti against concertino of violins – a method preferred by Corelli in his multi-movement structures – or extended to various configurations of solo strings and winds, an approach perfected and brought to virtuose heights by Vivaldi. The emphasis on contrast spread to most instrumental forms; dance suites and overtures in particular display great diversity in orchestration, ranging from solo woodwind phrases echoing tutti passages, to entire middle sections in da capo dance movements given to a trio of two oboes and bassoon.

The last three decades of the 17th century saw the rapid spread of the new Italian vocal and instrumental forms to all the major European musical centres. An increasing number of Italian composers were offered positions in foreign courts; there they either rearranged earlier works or composed new pieces to suit the local conditions. Inevitably, the need for diversity created a much broader spectrum in orchestration than the one they had left behind in Italy. Court opera developed in two major new locations, Vienna and Paris, both with considerable instrumental resources. Under Emperor Leopold I, the Habsburg court developed a permanent musical establishment for opera and oratorio (the latter given during Lent) which was noted for spectacular productions throughout the Baroque era. Italian domination manifested itself in all aspects of the Kapelle: composers, singers, librettists and several instrumentalists were imports. What the musical content lacked in originality, was made up for in resources; in 1705 the Hofkapelle numbered 102 members (including the vocalists). All contemporary Italian devices in orchestration were put to use: tutti strings enlarged with oboes and bassoons, concerted arias and duets with a variety of instruments, woodwind trios in dances and other instrumental pieces, brass ensembles in large choral scenes, and echo effects. Among the more unusual settings is the final scene of Antonio Draghi's *Il riposo nelli disturbi* (1689): composed for double choir, the first choir is accompanied by three 'clarini' and two trumpets, while the second group uses three sections of violins, two cornetts, three trumpets and basso continuo. Draghi also showed a preference for brass instruments in his oratorios. Other unorthodox combinations include the use of the chalumeau in works by Ziani and Giovanni Bononcini. However, in Vienna, as in Rome, the strongly individualistic approach to orchestration declined dramatically after 1720 in favour of more uniform string-dominated groupings (with a few winds).

In contrast to the Italian dominance of the Viennese musical scene, the evolution of orchestration in France followed an independent path. Although the Parisian court had at its disposal considerable instrumental resources from the beginning of the 17th century onwards (the Grande Ecurie, the Chapelle, the Chambre and the 24 Violons du Roi), a recognizable ‘French timbre’ started to emerge only after the ascension to the throne of Louis XIV, and the appointment of Lully as *compositeur de la musique instrumentale* in 1653. French Baroque orchestration owes its individuality to the ballet, which remained the favourite theatrical genre throughout this period. In place of the Italian vocal and instrumental bel canto idiom and the emphasis on virtuosity in instrumental music, Lully underlined the contrast of timbres among the woodwinds, strings, the extended continuo group and the occasional brass instruments. When in 1672 he assumed the direction of the Académie Royale de Musique, Lully had fused the 24 Violons du Roi and the ‘petits violons’ into a full orchestra of over 40 members. To this he added woodwind and brass players from the Ecurie and several ‘part-time’ players of unusual (non-orchestral) instruments. The regular orchestra consisted of a five-part string group of instruments of the violin family; bass viol, theorbo and harpsichord; transverse flute, recorders in five sizes, oboes and *taille de hautbois*, and bassoons; and trumpets with timpani. In the string group, the violins took the highest part (*dessus de violon*), 3 viola parts filled out the middle, and the *basse de violon* (tuned a whole tone lower than the cello) performed the bass part. Woodwinds were given prominent parts, sometimes without the strings. Furthermore, Lully established an elite chamber ensemble, the *petit choeur*, the members of which were charged with the ‘singing and accompanying of recitatives and ritournelles’ and, in general, with the performance of the most demanding pieces. Having created this distinctive subdivision within the orchestra, Lully extended the principle of contrast into a permanent system of performing practice in the Académie which was taken up by Rameau and remained a constant feature to the end of the Baroque era. As well as in his ingenious application of the subdivisions of the orchestra, Rameau's importance as an innovative orchestrator lies chiefly in the well-drawn indications for individual instrumental use in his colourful scores and in his nature-related music, which ranges from solemn ‘sun festivals’, to bird songs, tempests and earthquakes.

17th-century England was slow to adopt continental musical customs. This reluctance was due partly to the political upheaval caused by the Civil War, partly to the abolition of the King's Musick during the Commonwealth, and partly to the preference of the music-loving public for the contrapuntal idiom of late Renaissance vocal and instrumental works. Outside the court, very few of the aristocracy maintained a musical group large enough to include an orchestra. In addition, the new Italian violins, the essential component of the Baroque orchestra, became available in larger numbers in England relatively late, after 1660. Hence, regardless of the fact that about 100 musicians were engaged at court until 1642, a systematic orchestral practice did not evolve until the last decade of the century. In general, English composers dealt with orchestration in a more individualistic way than their Italian and French counterparts. On the one hand, court music – prompted by Charles II's preference for the French orchestral style – embraced the newly-organized band of the 24 violins (with a few additional winds), using it for entertainment, birthday odes, masques and other fashionable pieces, all played in the Lullian manner. On the other hand, the theatre provided English composers with an opportunity to exploit more unusual instrumentations. Though the infiltration of Italian concerted music increased from 1670 onwards, the English theatre orchestras, unlike those of the Venetian opera houses, were not dominated by the string group. Oboes, bassoons, recorders, transverse flutes, trumpets and timpani were the preferred instruments in larger productions together with a four-part string ensemble and harpsichord. For occasional music, a three-part setting was the standard arrangement in vocal pieces and instrumental interludes alike, while choral scenes used the tutti strings with trumpets or oboes. Certain characteristic patterns can be observed in the music of Purcell: vocal solos were often accompanied by two recorders or flutes and basso continuo; the trumpet appears as a favoured timbre, with a solo voice and continuo, or as a pair in conjunction with four-part strings and continuo for symphonies (sometimes two oboes, tenor oboe, bassoon and timpani were added to this grouping). A curious ‘special effect’ marked ‘tremulo’ occurs in the ‘Prelude while the Cold Genius rises’ in *King Arthur*.

In reference to foreign influences, one finds connections to the French style of orchestral subdivision in a number of scores written during the last decade of the 17th century: ‘Grand Chorus’ or ‘play all’ is contrasted with the term ‘vers’ for solo voice with small ensemble accompaniment in works by Eccles, Jeremiah Clarke, Daniel Purcell and Finger; and trio sections are scored for two oboes and bassoon, in the French style. Native experimentation with instrumentation for stage music and orchestral works was cut short by the successful introduction of Italian opera to English audiences (Giovanni Bononcini: *Camilla*, London première, 1706). The sensation caused by Handel's *Rinaldo* (1711) illustrates the shift in public taste towards the Italian style. Handel's orchestration, however, is not purely Italian: elements from the French tradition (extensive use of woodwind instruments) are mixed with the German interest in brass sound and spiced with ‘special effects’, all fused into a wide palette of timbres. In Handel's orchestral music the size and combination of instruments seem determined by the form and occasion. The concerti grossi were set for the Corelli-type string chamber group enlarged at times with solo woodwinds but a wind band of over 100 players performed the Music for the Royal Fireworks during a public dress rehearsal at Vauxhall Gardens. Handel's imagination for instrumental hues came to the fore in his operas and oratorios. There his basic orchestra of strings, woodwinds, a select brass group and continuo adhered to the Italian concerto subdivision: the ripieno section played the introductions and ritornellos in arias and duets, whereas the vocal accompaniment was assigned to the smaller (concertino) group, comprising mostly strings. Recorders and flutes continued their traditional role in pastoral scenes; exceptional virtuosity appears in the transverse flute writing of *L'Allegro, il Penseroso ed il Moderato*, where the soprano and the solo flute imitate bird calls over a light continuo accompaniment. As in Italy, brass instruments are usually added to the choir in dramatic scenes and there are numerous instances where brass sounds are used to signify danger, death or conspiracy.

Two examples of ‘special effects’ used by Handel are the carillon (a keyboard instrument on which hammers strike bells or metal plates) in *L'Allegro* and the harp mixed with the mandolin in *Alexander Balus* to suggest an exotic oriental sound.

New Italian forms were introduced in Germany by Schütz following his two visits to Venice during the early part of the 17th century, but his attempts to create a broader base for a truly German Baroque instrumental sound were all but eradicated by the ravages of the Thirty Years War. Germany's artistic recovery (after 1670) coincided with the gradual spread of Italian and French styles in orchestration. Orchestras were traditionally employed at courts, in wealthy independent cities and by the larger congregations of the Lutheran churches. The activities of the *Collegium musicum* societies of German universities increased the public's awareness of contemporary music and helped to create a demand for permanent instrumental groups in smaller centres by the end of the Baroque period. While Munich, Dresden, Berlin and the courts in the far eastern provinces demonstrated a strong dependence on Italian customs, the western and northern regions showed a varying level of interest in the musical style of France: young composers such as Georg Muffat, Johann Fischer, J.C.F. Fischer and J.S. Kusser were sent to Paris to learn the ‘new’ violin technique and subsequently composed in the latest fashionable contemporary forms.

Major court orchestras averaged between 14 and 20 players in size, though this number was sometimes increased for festive occasions. The orchestra of the publicly supported Hamburg opera was the only ensemble in the independent cities comparable in size to that of the Académie Royale de Musique. The larger court bands of Brunswick, Hannover and Stuttgart had enough flexibility to perform orchestral works and concertos, accompany operas and other vocal pieces, and play dance music for the ballet. The standard German Baroque orchestra contained all the wind and string instruments (with some percussion) regularly used in Italian and French orchestras, and the resulting mixed style of orchestration is characteristic of late Baroque instrumental practice in Germany. The Italian virtuoso concertino-ripieno orchestration functioned alongside the French multi-level *petit choeur-grand choeur* division, often employed alternately for consecutive movements or arias in the same piece. Recurring ideas include a solo violin with solo voice over a basso continuo accompaniment, with or without strings; flutes used as a contrast against the tutti orchestra or as unaccompanied instrumental colour in arias; and muted double-reed and brass instruments. After 1700 pizzicato became a widely used device, sometimes involving the complete string section, at other points the cello section or the double basses alone.

Bach's experimentation with unusual timbres and newly designed instruments resulted in seemingly endless combinations. In his orchestral works he increased the number of concertino players and scored for a greater diversity of solo instruments (e.g. Brandenburg Concertos nos.1 and 2). In scoring for the ‘quiet’ instruments (transverse flute, bass viol, etc.) the entire ensemble was considered as a concertino with additional continuo accompaniment (Brandenburg Concertos nos.3 and 6); hence there was no need for doubling. Furthermore, he transferred the violin-dominated solo concerto idiom to the harpsichord, thereby elevating that continuo instrument to solo status in the orchestra and establishing the keyboard concerto as an independent form. Bach's most ingenious scoring can be found in his large-scale vocal works, written mainly for the Lutheran church service. He maintained variety, often in accordance with the dictates of the text, by mixing contemporary (French, Italian) performing customs with the earlier polychoral technique, thus creating a rich source of vocal and instrumental colours to be played by solo and tutti ensembles within the available subdivisions. His diverse instrumentation included, in the woodwinds: the transverse flute, recorder, *flauto piccolo*, four types of oboe (including da caccia, taille, and d'amore) and bassoon; in the brass: horns, trumpets and timpani, and trombones, to which the *corno da tirarsi*, *tromba da tirarsi* and *cornetto* are added; and the strings were extended to include the violino piccolo, viola d'amore, *violetta*, bass viol, violoncello piccolo and viola pomposa. For a more detailed discussion of his use of continuo instruments, see Dreyfus (1987).

An examination of Baroque orchestration would be incomplete without a brief mention of Telemann's contribution to the subject. In his preface to *Der Harmonischer Gottes-Dienst* (1725–6) he reiterated most of the above described principles of instrumental usage relative to vocal accompaniment: when and how to combine the solo obbligato part with the ripieno and, as a reference to performance practice, the double meaning of dynamic signs, i.e. *f* = loud/tutti, *p* = soft/solo. Furthermore, it is generally accepted that the orchestration of his later works serves as a transition towards the galant style through colourful timbre combinations within a lighter texture that placed the emphasis on the melodic line.

Mary Térey-Smith

3. 1750 to 1800.

The change of style in instrumental music which occurred towards the middle of the 18th century naturally affected methods of orchestration. Under the influence of the Italian opera overture and the prevailing aristocratic taste, composers came to adopt a style of writing that emphasized a single melodic line, often based initially on the major or minor triad, and relied on crisp rhythms in *allegro* movements. There was not, however, a complete break with the past.

Fugal movements or movements containing extensive fugato writing, occur, often as finales, in the works of Richter, Monn, Wagenseil, the two Haydns and Dittersdorf, and may be said to reach their climax in the finale of Mozart's 'Jupiter' Symphony (no.41). The clarity of Baroque orchestration was maintained, so much so that often the strings are in two-part harmony, with first and second violins in unison and violas an octave above the cellos. The reason for treating the violas in this way can hardly be the alleged incapacity of viola players, since they were expected to be as nimble as the other strings. The purpose is obviously to add a greater clarity to the bass line, as an organist might by adding a 4′ stop on the pedals. The practice of writing figured basses gradually disappeared during the second half of the 18th century, though it is still to be found in C.P.E. Bach's symphonies and continued in London for some time (e.g. in symphonies by J.C. Bach and Boyce). A keyboard instrument, however, remained an essential part of the orchestra and presumably supplied the missing harmonies when the texture was in two parts.

Many of the earlier symphonies are written for an orchestra of two oboes, two horns, bassoons and strings, sometimes with the addition of a single flute and sometimes with two flutes replacing the oboes. As late as 1788 Mozart, in the first version of his G minor Symphony (no.40, k550), was writing for an orchestra of this size. These limited resources provided fewer opportunities for contrast than the larger Baroque ensembles, but the principle of contrast was still observed, though it operated in a rather different way. Oboes doubled the violins in a tutti and intervened from time to time as soloists. Doubling, however, was not consistent, and a further use for oboes and horns was found in the provision of a harmonic background, either sustained or emphasizing the beats in a tutti. When four horns were used, for example in occasional symphonies by Vanhal, Haydn (nos.13, 31, 39 and 72) and Mozart (nos.18, 19, 25 and 32), an even richer background was possible, particularly if the two pairs of horns were crooked in different keys. Bassoons, at first used merely to double the bass, became more and more independent: like the oboes and horns they could contribute to the harmonic background, and a single bassoon could share solo passages with the other woodwind. Mozart in particular delighted in writing for flute and bassoon two octaves apart. Passages for wind alone, in contrast to the strings, for example in Haydn's 'Military' Symphony (no.100), are common, as they had been in the early part of the century, but more characteristic is the occasional appearance of one or more wind instruments from the ensemble.

The introduction of the clarinet, in an improved form, added to the resources of the woodwind family, but it was not until the later years of the century that it became generally available. Apart from concertos (e.g. those by Carl Stamitz) the earlier composers showed little understanding of the instrument's capabilities and tended to treat it like a variety of oboe, to which indeed it was often an alternative. The writing for clarinets in Mozart's 'Paris' Symphony (k297/300*a*, 1778) shows no evidence of the sensitive approach to be found in his works a few years later. In the five symphonies from Haydn's Second London Set which include clarinets there are isolated solo passages (notably in nos.99 and 103) but relatively little idiomatic writing, though shortly afterwards he wrote effectively for the instrument in *The Creation* (1798).

An early example of arpeggios in the lower register of the clarinet occurs in the Andante of the overture to J.C. Bach's *Temistocle* (1772), written for Mannheim. There are three clarinets here, described as 'clarinetti d'amore'. The notation is for instruments in D, with the third instrument written in the bass clef and transposing up a 9th in accordance with a convention of the time. Since, however, the arpeggios for the third instrument go down to written *C* (sounding *d*) it seems probable that the parts, in spite of the notation, are actually for clarinetti d'amore in G, the key of the movement. Later effective examples of arpeggios in the lower register occur in the introduction to Haydn's *The Creation* and the Trio of the Minuet in Mozart's Symphony in E♭ (no.39, k543). Arpeggios covering a wider range are common in concertos and in pieces like the aria 'Parto, parto' in Mozart's *La clemenza di Tito* (1791), where the clarinet obbligato is played by an instrument with an extension of a major 3rd to the bottom of its compass. It may have been a growing appreciation of the tone-colour of the lower register of the clarinet that induced composers to replace it on occasion by the basset-horn.

In an ensemble consisting of woodwind, horns and strings there were no serious problems of balance; it was obviously felt, however, that the high trumpet parts written by earlier composers would disturb this balance. Such parts were still being written in England by Boyce as late as the 1770s, but continental composers preferred to avoid the higher register and to use trumpets mainly to reinforce a tutti, though the limited number of notes available imposed some uncomfortable restrictions when the music modulated away from the tonic key. When Mozart provided additional accompaniments for *Messiah* in 1789 he suppressed or rewrote all Handel's trumpet parts, though he originally thought of retaining the obbligato in 'The trumpet shall sound'. A natural consequence of the change of style was that trumpeters lost the art of playing florid parts in the high register. Horn players did not suffer the same fate. Passages of extreme difficulty, both at the top and at the bottom of the compass, occur in a number of late 18th-century works, for example in Haydn's Symphony no.51 (c1772), where in the Adagio the first horn (in E♭) rises by step to the 22nd harmonic (sounding *a*♭″) and the second horn descends to the note sounding B♭. Mozart made less extravagant demands but did not exclude virtuosity, for example in Fiordiligi's aria 'Per pietà' in *Così fan tutte* (1789). Timpani, as in the past, were normally, but not invariably, associated with trumpets. Composers discovered that both trumpets and timpani could be used quietly, as well as to reinforce a sonorous tutti. In the Adagio of Haydn’s Symphony no.102 both the trumpets and the timpani are muted, though they are required to play *forte* as well as *piano*. An effective use of *piano* timpani, without trumpets, is at the end of ‘Et incarnatus’ in Haydn’s *Theresienmesse* (1799).

Until the invention of the valve trumpet in the 19th century a flexible and homogenous brass ensemble was hardly possible. Gluck, in *Orfeo ed Euridice* (1762), followed the old tradition of associating cornetts with trombones; but by that time the cornett was virtually obsolete, and Gluck had to replace the instruments with clarinets when he revised the work for Paris in 1774. The reintroduction of trombones into opera was natural at a time when composers sought to intensify the impact of drama. Hence Gluck used them in *Orfeo* to give extra emphasis to the Furies’ cries of ‘No’ and to create a striking contrast with the harp and pizzicato strings which accompany Orpheus. Trombones are also associated with the Furies in *Iphigénie en Tauride* (1779) and similarly with the statue and the powers of Hell in the final scene of Mozart’s *Don Giovanni* (1787). As instruments which had long been used in the church, they were equally suitable for scenes of a solemn or ritual character, such as the march that opens the second act of Mozart’s *Die Zauberflöte* (1791) and the aria ‘O Isis und Osiris’ which follows. In church music and oratorio their main function was to support the altos, tenors and basses of the chorus.

By the end of the 18th century the treatment of the woodwind, whether it included clarinets or not, had acquired a subtlety unknown to the earlier symphonists. The master of this art was Mozart, not least in his piano concertos. The instruments engage in dialogue with each other or with the solo pianist. Phrases are nonchalantly passed from one to the other, so that the instrumental colour is constantly shifting and changing. The horns, though less prominent as soloists, participate in this activity. This subtlety extended to opera; the entry of the horns in the aria ‘Dove sono’ in Mozart’s *Le nozze di Figaro* (1786) has an emotional force far exceeding the simple means employed. Gluck had already shown how instruments could interpret what the characters in a drama were feeling or even what was in their subconscious minds. In *Orfeo* a wind instrument echoes the singer’s cry ‘Euridice’ – a clarinet (chalumeau) in the original version, an oboe in the revised version for Paris. The plaintive appoggiaturas for oboe in Agamemnon’s air ‘Peuvent-ils ordonner’ in *Iphigénie en Aulide* (1774) show Gluck’s instinct for choosing the right instrument, as does the flute solo in the D minor Ballet of the Blessed Spirits in the Paris *Orphée* which drew from Berlioz the exclamation ‘Quel poète!’. Haydn’s approach was on the whole more direct; but the oboe solo at the end of the introduction to his Symphony no.104 is very much in Gluck’s vein, and the influence of opera is apparent also in the recitative for solo violin in Symphony no.7 (‘Le midi’), to which C.P.E. Bach’s Symphony in F (1776) supplies a parallel. Haydn had a gift for vivid illustration, for example ‘La tempesta’ (beginning quietly) at the end of his Symphony no.8 (‘Le soir’) or the lion’s roar – on trombones, bassoon and double bassoon, with trills for the strings – in *The Creation*. Equally vivid are the loud whoops for trombones in the hunting chorus in *The Seasons* (1801) – a type of writing that one associates more with Verdi; and in the finale of the Symphony no.68 the bassoons, generally regarded in the 18th century as serious instruments, are treated as clowns.

The emphasis on dramatic expression in operas of the second half of the 18th century led to a more extensive and detailed indication than formerly of dynamics, notably in the operas of Jommelli and Traetta. Abrupt alternations of *piano* and *forte*, sharp accentuation (*sforzando*) and the use of crescendo and diminuendo were characteristic of a new style of orchestral writing. The style immediately affected the composition of symphonies, and the crescendo, frequently used at the beginning of a movement, became a feature of performances at Mannheim, as well as being used by composers elsewhere, for example by Haydn in his Symphony no.1 and by Gossec in his op.3 no.6. It is unusual, however, to find distinctions of dynamics between one part of the orchestra and another; if a solo is marked *piano*, for example, the accompaniment is not normally marked *pianissimo*. Brass instruments usually have the same dynamics as woodwind and strings, and a good balance must have depended on verbal direction at rehearsal.

Jack Westrup

4. 19th century.

The 18th-century legacy to nascent Romanticism was significant. With Haydn and Mozart an increasingly standard orchestral force based on pleasing symmetries of voice, colour and number had taken shape, most progressively with the addition of the clarinet to the woodwind section. There arose a repertory of primarily orchestral devices – the so-called ‘Mannheim’ effects, drone figures to signify rusticity, the pairing of horns in 5ths to suggest pastorality, the use of fugue as a proffer of academic credentials, the association of brass and janissary percussion with military and by extension political activity, the monologues and conversations of the Mozart concertos – which began to be known and used well beyond their initial spheres of influence. Composers for the Italian lyric stage recognized the connection between character and instrumental timbre, as well as the possibilities of applying the vocal bel canto style to orchestral parts; the French had seen and heard remarkable exercises in the deployment of large instrumental and vocal forces by considerations of space, speed and volume. The new intersections of artistic enterprise fostered the notion of an essentially poetic use of the orchestra, one that emphasized the obvious correlations between visual and audible colour.

Both economic prosperity and the need to address sweeping demands for increased capacity on every musical front stimulated a new burst of activity in instrument manufacture that included both the perfection of rudimentary mechanics and the invention of whole new families of instruments. Innovation in instrument manufacture kept pace with composers' demands and in turn stimulated compositional advances. Chromatic mechanisms for the woodwind instruments (most notably the Boehm system, as perfected by the Triébert family for oboe, by H.E. Klosé and L.-A. Buffet for the clarinet, and by Almenraeder and Heckel for the bassoon) emerged in the 1830s and 40s. Piston- and rotary-valved brass instruments were introduced to the orchestra in the late 1820s and commonly adopted within a decade. A chromatic harp was made possible by Erard's double-action pedal mechanism of 1810. Instruments of the violin family were built with longer necks and fingerboards, a higher bridge, and increased tension of the strings to obtain a more powerful sound; use of the Tourte bow eventually became universal. The Romantics' fascination with classical antiquity resulted in antique cymbals and Middle-Eastern percussion being brought into the orchestra (and not a few suggestions of what was understood as the Greek and Roman heritage); military bandsmen, often simultaneously engaged as orchestral wind players, made use of a bewildering variety of old and new families of instruments.

Beethoven's many advances in orchestration were studied and absorbed by subsequent composers. Some notable effects are his melodic use of timpani in the Violin Concerto and scherzo of the Ninth Symphony, the separating of the double bass and cello lines in the 'Eroica' and the scherzo of the Fifth, and the birdcalls and other descriptive elements in the 'Pastoral'. Heroic ideals necessitated the enlargement of the orchestral force, which soon routinely included piccolo, double bassoon and three trombones. In the funeral march of the 'Eroica' Symphony Beethoven fashioned a noteworthy internal cross-reference with the use of percussive rhythmic figures in the accompanying strings to suggest a drum tattoo; in the Fourth Piano Concerto he engaged the performing force in an overt conversation, harnessing orchestration to evoke voice, gender and the suggestion of some unknown narrative. (This kind of thinking resonates strongly in Robert Schumann's Piano Concerto in A minor, 1841–5, where the piano takes a primarily 'feminine' role and the orchestra a 'masculine' one: almost certainly intended to suggest the voices of Clara and Robert themselves.) The addition of vocal soloists and a choir for the finale of the Ninth Symphony (1822–4) marked a turning point in orchestral sound, purpose and possibility.

Schubert's last two symphonies, the 'Unfinished' (1822) and the 'Great' C major (1825–8), could not have greatly influenced the earliest Romantic efforts owing to their temporary disappearance; yet they came to be known to both Schumann and Mendelssohn by the late 1830s and may well have had an impact on those composers' subsequent works. Schubert's orchestral technique evolved from a simplistic, almost naive approach in his scoring of the Fifth Symphony (1816; no clarinets, trumpets or timpani) to the sophisticated orchestrational details (string tremolo, haunting interjections of the trombones and so on) that serve as agents of a prevailingly psychological argument in the 'Unfinished'. In the 'Great' Symphony he again redefined orchestral possibility, with unprecedented washes of bold, homogeneous tutti sonority, the full integration of the trombones, and the refined delicacies of the slow movement, epitomized by the duo of cellos and oboe, and the gentle horn motif. The immediate repercussions of Weber's *Der Freischütz* (1821) were substantial, notably by virtue of the opera's success in defining intersections of dramatic, scenic and orchestral effect: e.g. the Samiel motif played by the timpani and by pizzicato double bass beneath tremolo strings, the use of horns to depict hunting, and the pair of piccolos used to evoke the supernatural.

Given its often prosaic strategies of accompaniment, Italian opera was a surprisingly fertile proving ground for imaginative deployment and combinations of instrumental voices. In the orchestral introduction to a singer's Scena, an extended instrumental solo with cadenzas might accompany the vocalist's entrance and continue into the recitative, e.g. the music for horn and harp which precedes Giulietta's 'Oh! quante volte' from Bellini's *I Capuleti e i Montecchi* (1830). The familiar 'Rossini crescendo' is primarily a matter of orchestration; the cello episode from the overture to Rossini's *Guillaume Tell* (1829), another milepost in the association of orchestral and human voice, was reflected in such passages from Verdi's work as the opening of *La Traviata* and the love scene in Act 1 of *Otello*. The economics of grand opera required, above all, ongoing novelty, as much from the orchestra as from stage machinery and scenic tableaux. In *Les Huguenots* (1836) Meyerbeer called for a viola d'amore (played in the first performance by Chrétien Urhan, who was also the viola soloist for Berlioz's *Harold en Italie*) and bass clarinet; he used saxhorns in *Le prophète* (1849). The increasing degree of violin virtuosity also had its effect on writing for strings, as instructions such as pizzicato, *con sordino*, *sul ponticello* and *col legno* became common in orchestral parts.

Berlioz, Mendelssohn and, to a lesser extent, Schumann profited as much from each other in defining the Romantic orchestra as they did from their predecessors. Berlioz, with his rare blend of curiosity, observation and passionate commitment to innovation, was the most progressive of the three. His approach to orchestral deployment grew naturally from his interest in expanding the ideals of the symphonic genre, typically for narrative or dramatic effect. Already in the *Messe solennelle* of 1824 the trumpets of the Day of Judgement are unleashed; by the *Grande messe des morts* (1837) the same material is presented by four brass choirs, one placed at each corner of the performance space, thus articulating what he later called his ‘architectural’ approach. The list of progressive details in the *Symphonie fantastique*, Berlioz’s first symphony (1830), is formidable: the troubled cello and double bass heartbeats at the start of the *idée fixe*; the two harps in the waltz movement; the echo dialogue between the english horn and an offstage oboe, and the ‘distant thunder’ of timpani in the pastoral scene; the clarinet evocations of the Beloved in both the fourth and fifth movements; and the bone-rattling *col legno* in the witches’ dance. The finale’s splendid opening with eerie and grotesque effects of muted *divisi* tremolo strings, wind glissandos and wolfish brass with stopped-horn echoes confirms the arrival of a persuasive new approach to orchestral sonority. Of these originalities, perhaps the most quickly absorbed were the multiple *divisi* writing for strings (also essayed by Mendelssohn) and the expansion of the woodwind from pairs to triples and quadruples with the addition of the piccolo, the english horn and the E♭ clarinet. The extent of the influence of Berlioz and French grand opera on Wagner is most audible in the opening gesture of the Prelude and the english horn solo in Act 3 of *Tristan und Isolde*. More subtle features of Berlioz’s style are the increasing association of timbre with gender (e.g. the voices of Harold, Romeo and Juliet) and the quintessentially French decoration of the night musics in *Roméo et Juliette*, *Les Troyens* and *Béatrice et Bénédict*. Equally original and provocative is the ‘once upon a time’ opening of Mendelssohn’s *Midsummer Night’s Dream* overture (1826), whose four chords for high woodwind seem to define how the combination of harmony, contour and registration can instantly evoke a narrative context; his elfin, lunar brush stroke carries through the overture and much of the later incidental music. Similarly evocative approaches are to be found in the descriptive overtures, most notably *Die Hebriden* (first performed 1832) and the spectacular scenic world of *Elijah* (1846). In the symphonies Mendelssohn adopted a somewhat more conservative stance, but all three major works (the Reformation Symphony, 1830, rev.1832; the Italian Symphony, 1833, rev.1834; and the Scottish Symphony, 1842) embrace the idea of orchestration to emphasize programmatic context. Tradition has it that Schumann’s understanding of orchestral possibility was rudimentary or flawed – and Chopin’s non-existent – but at the very least both composers demonstrated the particular poetry to be found in the interaction of a solo pianist and orchestra.

By the time Romanticism was in full flower, in the 1830s, it was necessary to take stock of the modern orchestra and to theorize its very concept. The first treatises on the new crafts of ‘instrumentation’ and ‘orchestration’ were by the French bandmaster Jean-Georges Kastner (1837, 1839) and by Berlioz (1843). Both men described the ambitus and acoustic properties of the available instruments and presented cases of their effective use by way of published musical examples in score. Berlioz emphasized the work of the composers he most revered – Gluck, Spontini and Beethoven – along with a few passages of his own; Kastner, meanwhile, described how the celebrated *Tuba mirum* from Berlioz’s *Grande messe des morts* had been constructed. Richard Strauss translated Berlioz’s work into German, appending new examples from later composers (1904–5), and Widor described his own treatise (1904) as an updated supplement. Other important texts (notably Gevaert, 1863; Ebenezer Prout, 1876; Rimsky-Korsakov’s *Principles of Orchestration*, 1913) followed the same general strategy. As the 19th century progressed, orchestration came to be understood as it is today: on the one hand, the disciplined knowledge of the construction and technical character of the individual instruments, readily learnt from manuals and directly from orchestral musicians; on the other, the body of thought concerning orchestral purpose, effect and philosophy, best learnt from the detailed study of published scores by innovatory composers. As textbooks the treatises served their purpose well (as in the case of Bruckner, who learnt his trade from books); as essays in aesthetics they were conspicuously less coherent. This latter might be said, too, of Wagner’s florid but uninformative musings on the orchestra’s role in music drama.

What is important about the treatises is how they tend to assume an entirely new, major step in the compositional enterprise, one that takes place after completion of a bar-for-bar draft playable at the keyboard. Operas, for instance, usually existed in vocal score long before the final full score and parts were ready; composers talked of having nearly finished a work, with only the orchestration left to do. So conceived, 19th-century orchestration amounts to a dialectic between the initial composition of passages with a particular scoring in mind, and the craft of subsequently distributing the rest among the available force. It could scarcely have been otherwise, given the multitude of different instruments (and transposition schemes) available to the symphonist, who now needed a fundamentally different compositional process than that which was required to compose a work for keyboard, chamber ensemble or strings alone. The second edition of Berlioz’s orchestration treatise (1855) included a new essay on ‘The Conductor’s Art’, recognizing another basic change: the transfer of authority for the transmission of orchestral works to another party. The daily interaction between chapelmaster and musicians was lost, and the conductor now shaped and in some respects finished the work according to his own sense of its sound and structure and the performance traditions of his orchestra. The notation of full scores became correspondingly more detailed, with instructions directed as much to the conductor as to the individual players.

Liszt, who came to symphonic composition in the late 1840s, was initially constrained by the modest size of the Weimar court orchestra (fewer than 40 players) and by his own inexperience; for a time August Conradi and later Joachim Raff assisted him in expanding short scores for full orchestra. But by the time of his orchestral masterpiece, *Eine Faust-Symphonie* (1854), he was able to muster a full force to excellent and decidedly personal effect, notably in the delicate and much admired chamber textures of the ‘Gretchen’ movement. Likewise in the 1850s Verdi developed a recognizably personal orchestral idiom, characterized largely by multi-octave doublings and great fertility in rhythmic distribution of the standard, repeated-note accompaniments of Italian tradition. The density of the notation tends to mask the subtlety of the result, a delicacy of nuance accomplished through staccatos, rests, and a prevailing soft dynamic: Verdi frequently admonished his conductors to do nothing with the orchestra that would impede expression onstage. Even the most explosive segments of the Requiem (1874) embrace a clarity of orchestral gesture seldom achieved in contemporaneous works of corresponding size.

Wagner's revolutionary redistribution of the orchestral force proceeded along two distinct avenues: the weaving of intricate orchestral counterpoint into a foundation of string sonority on the one hand, and the block opposition of large homogenous choirs, or bands, on the other. The brass were especially appropriate to the subject matter of the *Ring* (first performed 1876), with its dominant themes of heroism and strife and its frequent allusions to the nether regions; the result was a prevailing sonority of ponderous low-register brass, including not only bass trumpet, bass trombone and contrabass tuba, but also the specially designed choir of Wagner tubas. By contrast the unfulfilled longing of *Tristan und Isolde* is established largely by way of the melancholy double-reed sonorities; its ecstacy and night-time passion, by the strings. In sheer numbers the Wagnerian orchestra constitutes a quantum leap from a few dozen to nearly a hundred players, the size assumed by many later composers to be the orchestral norm. The post-Wagnerian composers Bruckner, Saint-Saëns and Franck, all of whom were organists, sensed and carried forward a correlation between Wagner's manipulation of the orchestral choirs and the registration of the pipe organ. Bruckner retained a strong reliance on the horns and low brass, notably in the Adagio of his Seventh Symphony (1881–3), the lament on Wagner's death with its celebrated climax for four Wagner tubas and conventional bass tuba. Brucknerian textures are often defined by string tremolo and pizzicato, the latter frequently outlining bass ostinato patterns over which various contrapuntal strategies are played out, but there is a concomitant effort to escape Wagnerian density in a search for clarity and sobriety of expression.

Brahms's practice combines an essentially Beethovenian approach to orchestral size and purpose with a pianist's understanding of multi-octave ambitus (e.g. Third Symphony, first movement) and bimanual juxtaposition (Second Symphony, second movement). The unmistakable, characteristic Brahms sound is achieved through a sensuous blend of interlocking melodic solos and duos supported by richly figured accompaniments rooted primarily in the strings. His considerable store of orchestral originality, e.g. the horn solo with violin obbligato at the close of the Andante of the First Symphony (1862–76), the triangle in the scherzo of the Fourth (1884–5) and the unprecedented sonorities of the solo work in the Double Concerto for violin and cello (1887), is put more to the service of structural rigour than glamorous display. But his copiously decorated final cadences achieve as climactic an effect as any in the century.

Late Romantic composers committed to nationalist ideals or the programmatic genres tended to proffer orchestral analogues of popular practice in which castanets, tambourines and guitar effects flavoured the ubiquitous Spanish rhapsody, and all manner of village band imitations – notably woodwinds in parallel 3rds – were intended to suggest the presumed simple pleasures of rustic life. Orchestrational device joined dance patterns, modal inflection and native language in the coding of nationalism. Late Romantic programme music relied heavily on orchestration for its effect, as in the willowy solo violin figure used to evoke the narrator in Rimsky-Korsakov's *Sheherazade* (1888), the clash of arms in Tchaikovsky's fantasy overture *Romeo and Juliet* (1869, rev. 3/1880), countless manifestations of bad weather and surges of a river or the sea.

Mahler and Richard Strauss shared an affinity for minutely detailed, copiously inked scores of broadly Wagnerian approach. Mahler's work is particularly compelling in its extremes, as in the shrieking cries of the Fifth Symphony (first performed 1904) or, at the other end of the spectrum, the childlike naiveties, such as the use of jingles and the absence of trombones and tuba in the Fourth (first performed 1901). He left a particularly personal stamp in the use of the then dangerously emblematic birdcalls, distant military trumpets and village bands; most memorably, perhaps, with the *Frère Jacques*/*Bruder Martin* round begun by double bass and solo bassoon in the darkly comic 'Hunter's Funeral Procession' movement of the First Symphony (first performed 1889). Strauss's orientation in the tone poems and symphonies is mostly programmatic (e.g. the tittering of *Till Eulenspiegel* and the majestic pipe-organ climax of Zarathustra's ascent) and, in the case of the symphonic cowbells and alphorns, occasionally excessive. But whatever their artistic merit, these kinds of passages made possible his orchestral triumph: the unmistakable silver of *Der Rosenkavalier* (1911), cast by the glockenspiel, high woodwinds and strings, and the three soprano roles, is in many ways an apt summary of the 19th century's aspirations. By the turn of the century, Debussy had begun the wholesale rethinking of compositional materials that resulted in yet another orchestral identity, one that is profitably compared with the work of the impressionist painters (see §5 below). His techniques constituted the aural equivalent of the fast-changing spectrum of 20th-century thought, and opened up new possibilities for composers just as some had begun to suspect, wrongly, that the riches of the hundred-piece orchestra had been thoroughly mined.

Matters of 19th-century orchestration and its history continue to provide fuel for debate in contemporary performance of that era's repertory. One question is the degree to which performers should feel welcome to adjust orchestration to account for later mechanical improvements and the changing taste that favoured the 'big orchestra' sound. The precedent was set early on, notably with Wagner's inclination to rescore passages in Beethoven's Ninth Symphony to achieve better balance. Recordings of the great orchestras and conductors of the latter half of the 20th century suggest that the custom of 'completing' natural horn and trumpet parts in the Beethoven symphonies with pitches available on the valved successors continues to be widespread. Where local or inherited performance custom begins to diverge from the best interests of the composition remains a matter for scholarly study and deliberation among historians, players and conductors. These issues were particularly engaged in the recordings of the 1980s and 90s by Roger Norrington, John Eliot Gardiner and other avatars of the performing practice movement. They revealed to many listeners how attention to a composition's original conditions of orchestral size, layout, mechanics and techniques (along with attention accorded to the composer's metronome markings) might result in fresh understandings of its context and meaning. At the very least they demonstrate the remarkable evolution of the relationship between the composer and the orchestra that the terms 'instrumentation' and 'orchestration' attempt to define.

D. Kern Holoman

5. Impressionism and later developments.

Perhaps the most original orchestration of the later 19th century is that which can be related to the movement in the visual arts known as Impressionism. Here the colours of the orchestra complement the other aspects of composition on more or less equal terms. Fragments of the sound spectrum are juxtaposed, rather than merely blended, and this may happen even within the compass of a single melody or motif. Without entering into semantics, it is fair to say that this type of scoring gives an impression of its musical object at least as much as Monet's famous *Impression* does of a sunrise. It is entirely appropriate that many paintings by the Impressionist school were listed in the private collection of Chabrier, who in his kaleidoscopic orchestral pieces, such as *España* (1883) and *Marche joyeuse* (1888), provided some of the earliest examples in this manner. Mahler, though generally applying his colours in broader strokes, well knew how to exploit the occasional dab of unexpected timbre, and his scherzos (as in the Fourth Symphony of 1900) often contain sudden and brilliant shifts of colour and texture.

The evolution of tonal harmony at about this time, with its expansion of resources and its loosening of the structural and semantic ties of diatonicism, allowed other aspects of sound, including instrumental colour, a far greater prominence. Composers began to recognize that it was not only the melodic, harmonic and rhythmic features of a musical form that could legitimately claim the listener's prime attention; agogics, dynamics and timbre began to be manipulated more consciously and more prominently. Again the obvious instances provide an apt correlation, for the most strikingly virtuoso handling of these formerly neglected 'parameters' is found precisely in the work of those composers most intimately concerned in the dissolution of diatonic harmony, Debussy, Schoenberg, Webern and, in his highly individual way, Busoni.

In the *Prélude à l'après-midi d'un faune* (1894) Debussy showed himself acutely responsive to the sensual properties of instrumental sound; it is hard to study the work's opening bars without seeing in them a refined development of Weber's orchestral thinking. The fine textural distinctions in the string writing achieved by using solos and subdivisions of the groups owe something to Berlioz and Wagner (see the string distributions in *Lohengrin*, for example), and the application of colour is often frankly impressionistic, but the evocative blends themselves are entirely within the Romantic tradition. Debussy's *Nocturnes* (1899) were in this respect an important step forward. A sense of melodic, harmonic or rhythmic purpose is entirely absent from the steadily moving chords and wispy arabesques of *Nuages*; texture and timbre are heavily relied on to convey not merely the required atmosphere but the whole of the composer's intentions. The fading percussion at the close of *Fêtes* foreshadows many a 20th-century composer's emancipation of 'noise' (Milhaud, Stravinsky, Bartók, Varèse, and eventually electronic music). In *Sirènes* Debussy used the additional colour of a wordless women's chorus, though here it is clearly programmatic – an uncharacteristic 'literalism' which obscures appreciation of the voices' timbral qualities. This idea, too, was taken up by later composers, for example by Ravel in *Daphnis et Chloé* (1912) and by Milhaud in *Les choéphores* (1915–16) and *L'homme et son désir* (1918). Debussy's later orchestral works are notable less for their colouristic innovations than for their elaboration of the figurational role of each instrument – an interest which may have come to him from the Russians in general and from Rimsky-Korsakov in particular.

Wagner, Debussy and Mahler seem to have been the predominant influences on the orchestral technique of Schoenberg. In *Pelleas und Melisande* (1903) and *Gurrelieder* (1911) the orchestration is both adventurous and ambitious, the latter work bringing into play a multitude of performers. More significantly, it is primarily with Schoenberg's name that the concept of the *Klangfarbenmelodie* (melody of sound-colours) is associated; in 'Farben' (no.3 of Five Orchestral Pieces, 1909) there is a minimum of melodic, harmonic and rhythmic activity, and the interest centres on the alternations and manipulations of blended instrumental colour. The piece is, in other words, a logical successor to Debussy's *Nuages*. If 'melody' is defined as 'that continuous aspect of music claiming the listener's chief attention', one can understand both the special application of the term to tone-colour and the peculiar conditions that must be accepted by a composer wishing to replace ‘pitch melody’ by ‘timbre melody’. As was to happen later with dodecaphonic music's avoidance of all diatonic suggestions, in ‘Farben’ Schoenberg could impose his new concept only through a ruthless negation – the withdrawal of anything likely to be construed as a melody of pitches. Webern's view of the matter was more positive; he wanted to integrate the rapid play of colours with existing compositional techniques, whether his own (Five Pieces, 1913; Symphony op.21, 1928) or Bach's (arrangement of *Ricercar a 6 voci*, 1935).

Although it is sometimes claimed that the 20th century has its own characteristic orchestral constitution – *The Rite of Spring* has often been cited as paradigmatic – the actual practice of composers has not supported this view, which arises rather from the relative stability of the orchestra's structure as an institution. It owes this stability more to its role in the furtherance of 19th-century music and traditions than to developments in 20th-century orchestral thinking. Composers of conservative inclinations, and especially those working within the symphonic tradition, have hesitated to question conventional norms of orchestral format and balance, their innovations being restricted to the gradual judicious addition of new timbres (further pitched and unpitched percussion instruments, the piano, previously neglected members of woodwind families, and to some extent instruments borrowed from alien cultural forms, such as the military band).

The reversion to Classical and pre-Classical models in 20th-century music led some composers to reduce the scale of their orchestral forces; other factors contributing to this tendency were considerations of economy (notably in the works composed by Stravinsky after 1913) and the exploration of new varieties of orchestral balance. It was the latter that caused Stravinsky to dispense with violins and violas in his *Symphony of Psalms* (1930), though it is possible to find precedents for this in 19th-century music: violins are not used in Méhul's *Uthal* (1806) or in Brahms's A major Serenade op.16 (1859), and Fauré's exclusive reliance on lower strings in the first two sections of his Requiem (1887) anticipates Stravinsky's work still more closely.

For many composers the abandonment of Wagnerian orchestral forces was followed by a fundamental redistribution of timbral balance on a far greater scale than the minor adjustments of the *Symphony of Psalms*. For Stravinsky himself *The Rite of Spring* (1913) gave way to the wind-dominated *Renard* (1915) and the pitched percussion sonorities of *The Wedding* (1923); Webern followed the vast forces of his Six Pieces (1910) with the attenuated solo textures of the Five Pieces (1913), although even in the earlier pieces his instrumentation had already become characteristically rarefied; and Varèse retained little more than the luxuriant percussion department of the immense *Amériques* (1921) orchestra for his subsequent *Hyperprism* (1923), paving the way for the exclusively percussive *Ionisation* of 1931. Arguably Schoenberg had led the way with his scaling-down of the orchestra to a mere 15 solo instruments in the First Chamber Symphony op.9 (1906), where the instrumental writing suggests a debt to Wagner's *Siegfried Idyll* (1870).

Chamber orchestras became increasingly common in music written during the first decades of the 20th century. Sometimes, as with Schoenberg's work, the smaller ensemble proved a more flexible medium for the articulation of a richer than normal polyphony. Sometimes allusions were intended to the ‘classical’ sonorities of the 18th century. That trend was far from unknown in the 19th century, which had its divertimentos and serenades for wind or strings (Dvořák, Grieg, Gounod), but in the 1920s and thereafter the classicizing tradition became central to the music of Stravinsky, Hindemith, Bartók and many others. Sometimes there might be reference to typical forms of early jazz ensemble (Stravinsky, Copland and Hindemith again provide examples, along with Milhaud and Weill), though more often the instruments were freely selected to make up unprecedented combinations (Varèse, and many works by Ives and Milhaud). In the extreme case of heterodoxy, composers would build their own instruments, as Russolo did, and later Partch. From the 1930s onwards new electronic instruments began occasionally to enter the orchestra, especially the ondes martenot (Honegger, Varèse, Messiaen) and the theremin (often in film music).

The further anti-conventional impetus of the years immediately after 1945 was reflected in a widespread rejection of the symphony orchestra in favour of mixed groups of soloists. This reaction was perhaps fuelled by the evidence of recent history, which indicated a regression by most leading composers – Schoenberg, Stravinsky, Hindemith, Bartók – towards more conservative, even 19th-century, ways of writing for orchestra. For a challenge to that tradition, composers looked back to such works as Schoenberg's *Pierrot lunaire* (1912), which in some cases offered a direct model in using an ensemble as an effective foil to the voice (Boulez's *Le marteau sans maître*, 1953–5; Barraqué's *Séquence*, 1955). Since timbre was now to be treated as a primary musical variable, the instrumentation of a piece began to be seen as essential and unique: that tenet underlay Stockhausen's and Feldman's works of the 1950s and 60s. Paradoxically, however, the foundation of performing groups to play the new repertory resulted in a new kind of conformity, centred on a core of 14 or so soloists representing all the usual orchestral instruments. Ligeti's works show elegant solutions to the severe problems of balancing such a formation.

However, the rejection of larger resources was not complete. Indeed, some orchestras, particularly those affiliated to European broadcasting organizations, positively encouraged experiment in the 1950s, 60s and early 70s. Instrumental groupings might be separated to produce spatial effects, as in Stockhausen's *Gruppen* (1955–7); earlier works using similar techniques had to wait until this period to be performed complete, for Ives's Fourth Symphony (1910–16) was not heard until 1965, nor Schoenberg's *Die Jakobsleiter* (1917–22) until 1961. Other possibilities included electronic transformation of instrumental sound (Stockhausen's *Mixtur*, 1964), alteration to the norms of orchestral placement (Boulez, Berio, Barraqué, Brant, Nono), movement of soloists on stage (Boulez, Musgrave), presentation of the orchestra as theatrical spectacle (Birtwistle, Stockhausen, Kagel), introduction of ancient, exotic or fringe instruments (Kagel, or, in a spirit more of local colour, Henze and Takemitsu), addition of electronic music on tape (Nono, Boulez, Babbitt), use of quarter-tones (Nono), addition of voices (Stockhausen, Berio) and re-centring the orchestra on wind and percussion (Messiaen, Birtwistle, Reich). Even in works for relatively conventional forces, these last three composers tended to conceive of the orchestra as a group of distinct choirs, rather as Stravinsky had done in works from *The Rite of Spring* to *Agon*, and so to maintain a tradition of block-style orchestration quite contrary to 19th-century practice.

No less powerful a condition of late 20th-century orchestration was, however, continued adherence to 19th-century models as exemplified in the works of latter-day symphonists (Henze, Davies, Schnittke), and from the 1970s onwards, in the music of less conventional composers (Berio, Feldman). Meanwhile those composers such as Stockhausen, who had little concern to integrate themselves within normal concert life, moved right away from the orchestra. This change, which made the orchestra again an essentially traditional institution, was precipitated in part by an increasing need for economy, since unconventional orchestration normally requires extra players and extra rehearsal time. Radical innovation in the 1980s and 90s was maintained mainly by smaller ensembles, and only where funding was still generous (as at Boulez's research institution, IRCAM, which fostered a large repertory of works with computer-controlled electronic transformation) or else when a prominent composer could command the resources of several ensembles (e.g. Reich's *City Life*, with urban sounds reproduced on samplers). Against the tide, Lachenmann, Holliger and some other composers have continued to expand orchestral resources by exploiting unconventional instrumental techniques. Composers such as Berio, Boulez, Knussen and Benjamin have also found the standard orchestra to be a continuing source of new sonorities and an abiding vehicle for creative virtuosity.

G.W. Hopkins/Paul Griffiths

6. Popular musical theatre.

Orchestration for American musical theatre in the 20th century grew, like the form itself, from both European-style operetta and popular theatre such as vaudeville. The former derivation used a reduced version of a ‘legitimate’ orchestra; the latter, a flexible scoring capable of rendering the new vernacular rhythms. Early masters of the two styles were respectively Victor Herbert (*Babes in Toyland*, 1903; *Naughty Marietta*, 1910) and Frank Saddler (*Very Good Eddie*, 1915; *Oh, Boy!*, 1917).

The 1920s and 30s saw the consolidation of the rhythm section – piano, drums, bass, occasionally guitar (as in jazz bands, which in fact were sometimes hired by name for theatre pits: e.g. the Red Nichols band for Gershwin's *Girl Crazy*, orch. Bennett, 1930) – as a foundation for the orchestra for jazz or dance shows. Such shows also employed saxophones (usually doubled by the clarinettists), unlike the operetta-style musicals. The two formats were of course often mixed and modified. In the course of maintaining a busy schedule, the best orchestrators (Saddler, Robert Russell Bennett, Hans Spialek) learned to utilize their players' special abilities. Woodwind players eventually had to double on more instruments, and not just those of like family: there was for a time a vogue for bass oboe, even oboe d'amore (both used in *Oklahoma!*, orch. Bennett, 1943), as well as alto flute and basset-horn. Two-piano teams, a popular attraction of the time, participated in the theatre as well; Kern's *The Cat and the Fiddle* (orch. Bennett, 1931) had three. Violas, their stereotypical ‘oompahs’ absorbed by the rhythm section, were (and are) sometimes omitted altogether; at other times, particularly in the absence of a piano, a second desk of violas was added to provide a more audible beat and a solid middle range.

With orchestrators' credits featuring more prominently in the playbills of the 1940s, each production began to seek more of an individual sound. This was the era when Bennett created a consistent sound for the big Rodgers and Hammerstein shows using non-doubling ‘operetta’ woodwind, harp and no piano, which he (with Philip J. Lang) continued to exploit into the 1950s for Lerner and Loewe as well. Ted Royal (*Brigadoon*, 1947) and Hershy Kay were important new names during this period, while Spialek (*Babes in Arms*, 1937; *The Boys From Syracuse*, 1938) withdrew from Broadway, to return for the revival of Rodgers and Hart's *On Your Toes* in 1983. The late 1950s marked the end to this approach as the doubling reed section became universal and newer voices in orchestration brought new sounds into the pit: notably Sid Ramin, Irwin Kostal (both of whom orchestrated *West Side Story*, 1957, to Bernstein's specifications), Ralph Burns, Eddie Sauter and Robert Ginzler. Ginzler, in particular, had his trademark sounds, such as high-pitched close harmony in the woodwind (*Bye Bye Birdie*, 1960; *How to Succeed in Business without Really Trying*, 1961). More and more, unique orchestral complements were tried: no string section (*No Strings*, R. Rodgers, orch. Burns, 1962); no upper strings (*110 in the Shade*, H. Schmidt, orch. Kay, 1963; *Anyone can Whistle*, S. Sondheim, orch. Walker, 1964); and special timbres such as the lute, cimbalom, accordion, double bassoon or harmonica.

As amplification gradually became universal it affected the sound of theatre orchestration, despite orchestrators' general determination to maintain an acoustically valid balance: vocal projection became less crucial, and the newer popular sounds affected scoring. A pioneer in this respect was the orchestration for *Promises, Promises* (B. Bacharach, 1968), with its studio-style use of microphones and rebalancing of the pit. This was the work of Jonathan Tunick, who came to be particularly associated with Stephen Sondheim, having orchestrated most of his works since 1970. From the 70s onwards, theatre orchestration has been characterized by the trend towards smaller and smaller orchestras, and the increased use of electronic instruments (including synthesizers, not only for distinctive colour but to replace absent instruments). Other orchestrators who have come to prominence during this period include William David Brohn (*The Secret Garden*, 1991; *Ragtime*, 1996), Billy Byers (*City of Angels*, 1989), Michael Gibson (*My One and Only*, 1983; *Kiss of the Spider Woman*, 1990) and Michael Starobin (*Sunday in the Park with George*, 1984). Outside the opera house the full orchestrations of earlier times are now heard mostly in special circumstances, such as concerts devoted to restoration and preservation.

Jon Alan Conrad