

some models, the sound of any of 150 or more instruments. The earliest electric keyboards, produced in the 1930s, had strings but no soundboard, with magnets picking up the strings' vibrations. This version was replaced about 1960 by a piano that had tuned steel bars or reeds, struck by a hammer. Today's digital piano has neither strings nor soundboard and can, with the aid of software and specialized CD players, allow the player to hear a piece in various ways, such as slowing down the tempo, isolating either the lefthand or righthand part, with the sound of a metronome, with orchestral accompaniment, record the player's efforts, and so on. The size of a digital piano ranges from a three-octave portable keyboard to an 88-key

full-size grand piano. See also **PLAYER PIANO**.

**digital recording** Also, *laser recording*. A means of recording sound that uses computer technology to translate musical or other sounds into a multitude of binary digits (hence "digital"), or bits, which are then reconverted into sounds by means of a laser and converter and can be amplified and played through loudspeakers.

Earlier recording methods all are based on analog principles, that is, the grooves on a record are replicas ("analogues") of the actual sound waves, and their fidelity (faithfulness to the original sounds) depends on how closely they correspond to it. To play back sounds the grooves are tracked with a needle or stylus, which further distorts the sound to some degree. Digital recording, developed in the late 1970s, uses neither groove nor stylus. Each sound, defined by its basic characteristics of pitch, loudness, timbre, and so on, is encoded as a binary number, and it is these numbers rather than the wave forms of the sounds that are recorded as a series of bits—strings of 1 and 0. The numerically defined sounds are immune to distortion.

The bits are etched, in the form of tiny pits, into a **compact disk**, or *CD*, which looks like a shiny aluminum disk with a clear plastic cover. To play the sounds back, a digital audio stylus, in which the pickup is not a stylus but a small laser, is used. The laser shines a fine beam of light on the tiny pits and, by registering changes in reflected light, counts them. The count, interpreted by a special circuit called a digital-to-analog converter, spells out the musical wave form into its original shape, which can then be amplified and played through speakers. Compared to analog records, the digital technique produces more clarity of sound, greater depth and definition of the low bass (no longer constrained by the limited width of the record

groove), total absence of scratch, hiss, and other background noise, and no record wear. The compact disks are almost infinitely durable; since nothing but weightless laser beams touches them during play, there is no abrasion. The coating of durable plastic prevents corrosion.

However, because digital sound is so close to the original, it clearly shows up any errors on the part of record producers. Further, listeners accustomed to the extraneous noises of the concert hall and the distortions of analog recording may at first find the very clarity and fidelity of digital sound quite strange.

The original compact disk was designed mainly for classical music (its playing time of 70 minutes was based on the duration of Beethoven's Symphony no. 9). Subsequently different digital formats were designed for popular music, a *minidisk (MD)* of 2.5 inches and a *digital compact cassette (CDD)*. Still another format is the *digital audio tape (DAT)*, a smaller than conventional cassette that can accommodate more detail than compact disks and consequently is widely used by recording companies to make professional tapes. Still newer is the **digital video disc**, or *DVD*, which combines digital video production with digital sound. It is especially suitable for recording opera, since typically a full-length opera can fit on a single disc.

Digital technology also has been extended to telecommunications techniques, enabling compactdisk sound to be transmitted over special telephone lines. First used for film soundtracks, this technology enables musicians to collaborate on a "live" recording even when they are physically separated by thousands of miles.

**diluendo** (deˈlo—o endô) *Italian*.

A direction to perform more and more softly, so the music seems to fade away.

**dim.** Also, *dimin.* An abbreviation for **DIMINUENDO**.

**diminished chord** A chord that contains one or more diminished intervals. The most important kinds of diminished chord are the diminished triad (for example, B–D–F) and the diminished seventh chord (a diminished triad plus a minor third, such as B–D–F–Ab). See **CHORD** for an explanation of these terms.

**diminished interval** An interval that is one half tone smaller than the corresponding perfect or minor interval (see **INTERVAL**, def. 2, for an explanation of these terms). In practice, the most important diminished intervals are the diminished fifth (one half tone smaller than the perfect fifth)



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which contain some of his finest work. Soon after, he turned to larger forms, and eventually he completed four symphonies, string quartets and other chamber music, his popular Piano Concerto in A minor, and some dramatic and choral works (the last seldom performed today). Schumann's lieder show a fine understanding of poetry, and his handling of the piano accompaniment is even more elaborate than Schubert's. His piano music, much of it short pieces, is typically romantic in its complex rhythms and meters, and abrupt changes of harmony. Outstanding among his many piano works are the *Études symphoniques* ("Symphonic Studies"), *David-sbundlertänze*, *Carnaval*, *Abegg Variations* (on the name Abegg, using the theme A B C E G G), *Papillons* ("Butterflies"), *Kinderscenen* ("Childhood Scenes"), *Kreisleriana*, *Albumblätter* ("Album Leaves"), *Blumenstücke* ("Flower Pieces"), and *Humoreske*. Of his other works, the overture and incidental music for Goethe's play *Manfred* still are often performed.

—**Clara** (klärä) **Wieck** (və'k) **Schumann** (1819–1896), who married Schumann in 1840, had made her debut as a pianist at the age of nine and four years later begun to tour Europe regularly. Except for the years during which she bore their eight children, she continued to tour regularly for more than fifty years. She also taught piano, and she directed several music schools. Much of her time and energy were devoted to promoting her husband's music; she saw to it that his works were published and performed, and she played much of his piano and chamber music herself. She also played much of the music of Brahms, her lifelong friend.

Her own compositions include a piano concerto, chamber works, including Piano Trio in G minor, numerous shorter piano works, and songs.

**Schupplattler** (sàho—oplät l@r) *German*.

A folk dance of southern Germany and Austria, in which the dancers slap their knees and the soles of their feet. The music, gay and lively, is similar to a fast waltz.

**Schütz** (sàhyts), **Heinrich** (hī'nri:kàh), 1585–1652. A composer who is remembered as the greatest German composer of his time. He is noted especially for his church music, in which he combined Renaissance polyphony (music with several independent voice-parts of equal importance) with elements of the new monodic style of the baroque (accompanied melody; see MONODIGAL, def. 2; also MONODY, def. 1). Schütz studied in Italy with Giovanni Gabrieli, master of the Venetian polychoral style (using two choirs in

alternation and together), which he employed in some of his own works. He also adapted features of Monteverdi's operas, mainly the recitatives and arias with continuo accompaniment. He himself wrote the first German opera, *Dafne*, which, however, has been lost. Schütz worked first at Kassel, where he was court organist, and later at Dresden, where he was music director for the Elector of Saxony. He often visited Italy, where he studied all of the current Italian styles, but at the same time he criticized German composers who copied the Italians without having a thorough background in contrapuntal writing. All of Schütz's surviving music is vocal, much of it accompanied by various instrumental groups. His finest works were written for the Lutheran church. They include his *Psalmen Davids* ("Psalms of David"; 1619), *Cantiones sacrae* ("Sacred Songs"; 1625), *Symphoniae sacrae* ("Sacred Symphonies," for voices and instruments; 1629–1650), *Kleine geistliche Konzerte* ("Short Sacred Concerts"; 1636–1639), *Christmas Oratorio*, and three Passions (see also ORATORIO; PASSION).

**schwach** (sàhvàkàh) *German*.

A direction to perform softly.

**schwindend** (sàhvind@nt) *German*. A direction to perform more and more softly, as though the music were dying away.

**sciolto** (sh àòltò) *Italian*.

Also, *scioltamente* (sàhòltà mente). A direction to perform lightly and nimbly.

**scoop** In singing, the undesirable practice of sliding from one pitch to another pitch, usually a higher one, instead of attacking each note cleanly. It differs from a deliberate PORTAMENTO.

**scordatura** (skòrdà too à rà) *Italian*. A change in the ordinary tuning of a stringed instrument, such as a violin, in order to play a particular passage or composition. It involves tuning one or more strings up or down in pitch by one half tone, one whole tone, or even more. In the seventeenth century scordatura was frequently used for lute compositions, the exact tuning required being indicated at the beginning of each work. Later it was used for violins and cellos. The music was written as though the tuning were normal; thus, if the strings were tuned one whole note higher than usual, the instrument would sound G for a written F, F for a written E, and so on. (The normal tuning for the violin's four strings is E, A, D, and G.) Paganini often tuned all four of his violin strings as much as a third (two whole notes) higher in order to brighten the tone. In Mozart's *Sinfonia concertante* in E-flat, K. 364, for violin, viola, and orchestra, the solo viola is tuned one



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**Vaughan Williams** (vôn wily@mz), **Ralph** (raːf), 1872–1958. An English composer and conductor who is remembered for his choral and symphonic works, which combine a variety of influences, ranging from impressionism to folk song. Notable among his works are *Fantasia on a Theme by Thomas Tallis* for string orchestra, *The Lark Ascending* for violin and orchestra, the ballad opera *Hugh the Drover*, Mass in G minor, and *Te Deum*. Of his nine symphonies, *A London Symphony* (no. 2) and *Sinfonia antartica* (no. 7) are frequently performed. Vaughan Williams's music is particularly notable for his emphasis on melody and, influenced by Elizabethan and Tudor music, **vamp** his interest in counterpoint and modal harmony (based on modes other than the major and minor). In his later works the harmony is quite complex, with free use of dissonance, although the forms remain traditional.

**vcl.** An abbreviation for CELLO.

**velato** (ve lätô) *Italian*. Direction to perform (usually sing) in a veiled, obscure manner, the opposite of clear and distinct.

**vellutato** (ve lo—o tâtô) *Italian*. A direction to perform in a very smooth manner.

**veloce** (ve lôcàhe) *Italian*. A direction to perform in a rapid tempo.

**Venetian school** A group of sixteenth-century composers who worked in Venice, Italy. Some were Italian and others were Flemish, that is, from what is now the Netherlands, northern France, or Belgium (see FLEMISH SCHOOL for an explanation). The most important members of the Venetian school were Adrian Willaert, Claudio Monteverdi, and Andrea and Giovanni Gabrieli (see MONTEVERDI; WILLAERT, ADRIAN; GABRIELI). Others were Cipriano de Rore, Giovanni Croce, Claudio Merulo, Marc'Antonio Cavazzoni, and the theorists Gioseffo Zarlino and Nicola Vicentino. Although they belonged to the historical period called the Renaissance (1450–1600), the Venetian composers in some respects looked forward to the coming baroque period. Among their early achievements was the increasing use of chromaticism (mainly through the use of many sharps and flats, as well as chromatic progressions, such as D–D#–E). Even more striking, especially with later composers such as Giovanni Gabrieli, was their development of the polychoral style (use of two choirs, singing in turn and together; see POLYCHORAL). They also introduced new instruments to their ensembles, especially wind instruments. In all these respects they influenced the early baroque composers,

especially German ones (Hans Leo Hassler, Michael Praetorius, Heinrich Schütz—all of whom studied in Venice). See also RENAISSANCE.

**Verdi** (verdeː), **Giuseppe** (jo—o sepe), 1813–1901. An Italian composer who is remembered principally for his operas, a number of which are among the finest of their kind and the most popular ever written. Such works as *Rigoletto* (1851), *Il Trovatore* ("The Troubadour"; 1853), *La Traviata* ("The Erring One"; 1853), and *Aida* (1871) are in the standard repertory of every opera company. Verdi's last two operas, *Otello* (1887) and *Falstaff* (1893), are in many respects his best, for throughout his long career Verdi continued to grow and develop, gradually turning from quite conventional treatments of form and orchestration to create highly dramatic, imaginative, and original works of art. Beginning his musical education as a village organist, Verdi wrote his first opera (*Oberto, Conte di San Bonifacio*) at twenty-six, and it was performed with considerable success at Milan's La Scala, Italy's most important opera house. Discouraged by the failure of his next work, Verdi was nevertheless persuaded to try again, and his third opera, *Nabucco* (1842), was an enormous success. Thereafter he turned out one or two operas a year, and in 1847 came the first of a number of operas based on Shakespeare plays, *Macbeth*. Despite occasional setbacks, Verdi had enough income to continue composing, and in 1851 came his first masterpiece, *Rigoletto*, followed two years later by *Il Trovatore* and *La Traviata*. There followed some lesser operas, all of which are still regularly performed—*Simone Boccanegra*, *Un Ballo in maschera* ("A Masked Ball"), *La Forza del destino* ("The Force of Destiny"), and *Don Carlos*. Up to this point, Verdi had retained the conventional form of the *opera seria* (see under OPERA). His popular success was due largely to his gift for writing fine melodies and his highly developed sense of drama. With *Aida*, written to celebrate the opening of the Suez Canal (1871), Verdi began to use the orchestra to enhance the drama instead of serving purely to accompany the singers. Also, he began to emphasize character and personality more than external events. These tendencies were carried even further in *Otello*, which has a remarkable libretto (based on Shakespeare's play) by Arrigo Boito. In his last opera (but only his second comic one), *Falstaff*, also to Boito's libretto (based on Shakespeare's *The Merry Wives of Windsor*), Verdi revealed, at seventy-nine, a masterful sense of comedy. Moreover, in *Falstaff* the orchestra supplies a kind