MUSIC IN THE TWENTIETH AND TWENTY-FIRST CENTURIES

Joseph Auner

Tufts University

In Chapter 1 we considered the metaphors of tangled chaos and the blank page to characterize the dizzying range of styles, slogans, and trends that composers faced in the early decades of the twentieth century. The development that we will explore in the final section of this book reflect a still more extreme multiplicity of approaches. Displacing notions of a mainstream or a widely shared culture, counter- and subcultures have proliferated in all aspects of life, as has every form of transcultural hybridization.

While the globalization of the economy, technology, and media has been a powerful homogenizing force, it has also facilitated a profusion of new voices and perspectives. A defining feature of this heterogeneity—sometimes producing it, sometimes responding to it—has been the rise of new fundamentalisms and the quest for a lost purity or simplicity. Some have responded to this pervasive pluralism with a voluntary isolation, while others have attempted to shout down or silence destabilizing voices and perspectives. Even among a class of college music students, there has never been less common ground in musical backgrounds, experiences, or interests. Or to put it another way, the broad influence of Musil's "sense of possibility," and the conviction that nothing has to be the way it is, has never been stronger.

Part IV covers musical developments from the 1960s through the present. While the trends considered in the previous chapters continued to play a central role, the social and cultural disruptions of the 1960s marked a significant turning point as composers and musicians reengaged more directly with history, politics, and the world around them. Chapter 12 explores how composers sought to move beyond Integral Serialism and Indeterminacy to create works with richly expressive surfaces and textures. They employed new techniques for working with sound masses and timbre, and created complex textures by piling up of layers of independent lines.

In contrast to postwar efforts to make a clean break with the past, we will see in Chapter 13 how composers used quotation and stylistic allusions to reconstruct and deconstruct musical histories of all kinds in such trends as Postmodernism and the New Romanticism. In Chapter 14 we focus on Minimalist composers who responded to the seemingly limitless possibilities by reducing music to its most basic elements and simple audible processes. The emergence of Postminimalism, with its eclecticism and hybrid forms of music-making, reflects the accelerating cycles of reaction and counterreaction. We conclude in Chapter 15 with composers of the youngest generation who are questioning many of the narratives that have shaped musical developments since the early nineteenth century, while at the same time challenging long-established borders between musical traditions, music and other cultural forms, and composers and their audiences.

CHAPTER TWELVE

Texture, Timbre, Loops, and Layers

One of the most significant musical trends since World War II involves the de-emphasizing of melodic and harmonic motion, and even the significance of individual notes, to allow texture, timbre, rhythm, dynamics, and register to take center stage. The origins of what we will call "texture music" lie in electronic music, Integral Serialism, and Indeterminacy. But composers working in this broad category have developed a remarkable range of compositional techniques that draw upon an equally remarkable diversity of influences and inspirations. While pursuing very different expressive and stylistic ends, composers of texture music share a fascination with how we experience sounds as they move through time, building and fading, coalescing into stratified layers or thick clouds, or dissolving into particles.

From traditional musical perspectives, the works we will consider in this chapter are some of the most esoteric that we have encountered so far. Surprisingly, however, the emphasis on surfaces and timbre makes much texture music immediately expressive and effective. A clear measure of this ability to communicate a wide range of emotions, from transcendence to terror, is the ease with which the sounds of texture music have become part of popular culture. Inspired by works by György Ligeti and Luciano Berio, the Beatles brought an orchestra into the studio to improvise the surging sound masses in "A Day in

the Life" (1967). Pieces by Ligeti and Krzysztof Penderecki have been featured in the soundtracks of Stanley Kubrick's *2001: A Space Odyssey* (1968), *The Shining* (1980), and *Eyes Wide Shut* (1999), and more recently in Kathryn Bigelow's *The Hurt Locker* (2008). It is now common for film composers to employ ambient textural effects in place of traditional leitmotivic character themes, as in scores by Thomas Newman (*American Beauty*, 1999) and James Newton Howard (*The Dark Knight*, 2008).

Texture music's accessibility can also be attributed to many composers' incorporation of a wide range of influences, including, as we shall see, non-Western traditions and popular styles. There are significant points of contact between textural approaches and Afro-diasporic forms of groove-based music, from funk to hip-hop and electronic dance music, in which the focus is more on rhythm, timbre, and shifting layers than on harmonic or melodic development. Lines have also blurred between popular and art music in the mass effects of layered distorted instruments employed by bands like My Bloody Valentine, Nine Inch Nails, and Sigur Rós, and works by composers like Rhys Chatham, who wrote *An Angel Moves Too Fast to See*, for 100 Electric Guitars, Electric Bass, and Drums (1989).

Texture music is thus not simply another "ism," but a more general manifestation of the new possibilities for creating form, structure, and expression when melodic development and harmonic progression play only a limited role. The categories of texture music we will consider here provide an overview of the trends that have been the most fertile and some of the composers associated with them. These subsets of texture music should not be seen as exclusionary; on the contrary, many composers have moved freely among them, sometimes embracing ideas from other post–World War II compositional trends as well. Similarly, much of the music we will be exploring in the following chapters has important textural elements.

ORIGINS OF TEXTURE MUSIC

One can hear anticipations of textural approaches throughout music history. In three- and four-voice organum by Perotinus from around 1200, sections are differentiated more by textural and rhythmic shifts than by changes in pitch content. In the early nineteenth century, Beethoven and Rossini wrote passages that rely on rhythm and dynamics to generate momentum; later in the century Wagner's astonishing Prelude to *Das Rheingold* was built on nearly five minutes of a sustained Eb-major triad. And as we have seen, throughout the first half of the twentieth century composers developed textural ways of working without functional harmonic progressions, including Debussy's techniques of varying "color and light," Schoenberg's tone-color melody, Stravinsky's explorations of rhythm and layering in the *Rite of Spring*, Berg's crescendo on a single note

in *Wozzeck*, and Varèse's sound masses. Yet the emergence of texture music as a distinct category is inseparable from the postwar emphasis on experimentation and rebuilding music from the ground up, the technological tools and techniques for working with sound that emerged with electronic music and *musique concrète*, and ways of listening in terms of overall effects rather than individual events that were suggested by Integral Serialism and Indeterminacy.

Poème symphonique (Symphonic Poem, 1962) for 100 amplified metronomes, by the Hungarian-born composer György Ligeti (1923–2006), illustrates how texture music relates to some of these earlier trends as well as the crucial differences between them. As much a "happening" as a musical work, Ligeti's "score" consists of detailed instructions for every step of a performance, starting with how to acquire the pyramid-shaped mechanical metronomes the piece requires. Ten players each wind up ten metronomes, which are to be set at different speeds and amplified so that their sound fills the performance space. After a silence of several minutes—both an allusion to Cage's *4' 33"* (see Chapter 10) and a prolonged upbeat for the racket that is about to begin—a conductor signals for the wound-up metronomes to be set in motion. Beginning as an undifferentiated mass, like raindrops tapping on a metal roof, the texture slowly thins out as the metronomes run down. As we begin to hear individual ticking layers, it is possible to make out complex polyrhythms, which in turn become ever simpler until only a single pulse remains. The piece is over when the last metronome comes to a standstill.

Poème symphonique was in part a deliberate provocation of the audience—a planned television broadcast of the premiere in Holland was canceled as too controversial—as well as a parody of the seriousness with which other avant-garde composers took themselves and their systems. But Ligeti's piece was also an effort to move beyond the trajectories of order and chance discussed in Chapter 10. On the one hand, once the various tempi and the tensions of the clockwork mechanisms are set, the *Poème symphonique* is as strictly determined as a work of Integral Serialism. On the other hand, Ligeti left many aspects of the piece indeterminate, including the precise tempo of the individual parts. In so doing, he dramatized an argument he had made two years earlier about the underlying commonalities of Integral Serialism and Indeterminacy. In his essay "Metamorphoses of Musical Form," published in *Die Reihe* in 1960, Ligeti wrote, "There is really no basic difference between the results of automatism and the products of chance; total determinacy comes to be identical with total indeterminacy" (SR 184:1383; 7/15:113).

Echoing the teleological narrative posited by Schoenberg and his students for the evolution of twelve-tone music (see Chapter 7), Ligeti justified texture music as the inevitable outcome of the development of Western music since the Middle Ages. In the essay, he argued that extending the twelve-tone method to other musical parameters undermined the fundamental significance of the row as a series of intervals. Instead of individual notes and their relationships to each

other, he observed that what we hear in Integral Serialism are "statistical properties of form, e.g. relationships of register, the density and weave of the structure" (SR 184:1379; 7/15:109). Ligeti had anticipated this way of hearing when he compared the sound of Pierre Boulez's *Structures I* to the patterns of light and dark created by city lights (see Chapter 10). Since both Integral Serialism and Indeterminacy inevitably lead to this "flattening out process," Ligeti asks, why not take the next step and work directly with surfaces, constellations of events, and global effects?

LIGETI'S SONOROUS TEXTURES AND MICROPOLYPHONY

Born into a Hungarian Jewish family, Ligeti studied music formally from an early age. During World War II several members of his family were killed in concentration camps, and he himself was conscripted into a forced-labor brigade, but managed to escape. After the war Ligeti adapted to the doctrine of Socialist Realism (see Chapter 9) imposed by Hungary's Soviet overlords, writing Bartók-inspired settings of folk songs and other ideologically acceptable works for public consumption. Meanwhile, he had already started experimenting privately with sharply reduced pitch materials in works like his *Musica ricerata* (Music Research, 1951–53). The first of these 11 piano pieces presents a single note, A, in varying registers, rhythms, and dynamics, until a second note, D, is introduced at the very end. The second movement similarly uses only two pitches, adding a third at the conclusion; the process continues until all 12 pitches appear in the final piece.

After the short-lived Hungarian Revolution and subsequent Soviet crackdown in 1956, Ligeti fled to Austria and then to West Germany, where he became involved with electronic music and other trends. In 1961 he attracted international attention with his orchestral work *Atmosphères* (Atmospheres), which, as he wrote in a program note, demonstrated that it was possible to replace "the motivic-thematic approach" with sonorities "so dense that the individual interwoven instrumental voices are absorbed into the general texture and lose their individuality." The work calls for a conventional orchestra, including a piano that is played directly on the strings. And while each part is precisely notated, one hears only vast, slowly shifting sound masses without any sense of meter or pulse. As *Atmosphères* unfolds, each section focuses on different aspects of texture, dynamics, register, and timbre. The piece begins with a softly sustained cloud of pitches in the middle register that gradually collapses into a cluster in the low strings. The second section expands the register while emphasizing timbral transformations as the various instru-

mental groups—first the strings, then the brass, followed by the woodwinds—crescendo to emerge from the mass.

The third section of *Atmosphères* uses strict procedures, including what Ligeti called the "micropolyphony" of closely spaced rhythmic and melodic canons, to create an intricate web of sound. Example 12.1 shows the music for the 14 first violins at Rehearsal C (the full score occupies 64 staves). The violins are divided into four groups, each of which oscillates between two pitches. Ligeti systematically increases the speed of the oscillation by subdividing each quarter note into ever-smaller parts, as similar processes unfold in the other instruments. All of this micropolyphonic activity takes place imperceptibly; as Ligeti explained, "The polyphonic structure does not actually come through, you cannot hear it; it remains hidden in a microscopic, underwater world, to us inaudible."

Ligeti brought such subliminal techniques to the surface in a series of works marked by frenetic mechanical activity, including *Continuum* for harpsichord (1968; see Anthology 21). He had employed the harpsichord for textural effects as part of large ensemble works, but he hadn't considered a solo piece until he

Example 12.1: *Györgi Ligeti,* Atmosphères, *Rehearsal C, excerpt, mm. 22–24, violin 1*

suddenly realized "that a harpsichord was really like some strange machine." Ligeti's childhood fascination with clocks and mechanical devices that fly out of control is reflected in his "meccanico" pieces such as *Poème symphonique* and the String Quartet No. 2 (1968), whose third movement is marked *Come un meccanismo di precisione* (like a precision mechanism). In *Continuum* Ligeti pushes both the mechanism of the instrument and the technique of the harpsichordist to the breaking point; he later mechanized the entire piece by preparing versions for mechanical organ and player piano.

Taking advantage of the harpsichord's two keyboards, *Continuum* begins with overlapping G–B♭ dyads played as fast as possible, creating the impression of a continuous sound. Figure 12.1 illustrates how Ligeti shapes the sound masses as they move through time by expanding the pitch content, shifting through different registers, and thickening the texture by layering ever more complex patterns that suddenly give way to moments of clarity.

In the midst of the mostly dissonant clusters, the striking introduction of a B-major triad, which morphs into B minor and then into a B-minor seventh chord, points to subsequent developments in Ligeti's music. In addition to reconnecting to tonality in various ways, he went on to engage with many different styles and traditions, including Minimalism, African music, quotation and collage (see Chapter 13), and the manic player piano works of Conlon Nancarrow (see p. 242).

TEXTURAL APPROACHES IN THE MUSIC OF STOCKHAUSEN AND BOULEZ

Ligeti was not alone in concluding that Integral Serialism and Indeterminacy offered new ways of working with masses of sound. As discussed in Chapter 11, Stockhausen began composing with textures in his *Gruppen* (Groups, 1957) for three orchestras, which consists of short sections, or "groups," each conceived as a musical object characterized by its overall qualities of duration, speed, intensity, and sonority. Stockhausen emphasizes the groups' contrasting and colliding textures by spatially separating the three ensembles and giving each its own conductor. In the early 1960s he extended the notion of working with groups to what he described as "moment form," first employed in the electronic piece *Kontakte* (Contacts, 1960). Instead of hearing passages in terms of where they come from and where they are going, moment form encourages listeners to focus on individual, self-sufficient units of time. Alluding to his teacher Olivier Messiaen's *Quartet for the End of Time*, Stockhausen wrote:

> This concentration on the present moment—on every present moment—can make a vertical cut, as it were, across horizontal time perception, extending out to a timelessness I call eternity. This is not an eternity that begins at the end of time, but an eternity that is present in every moment.
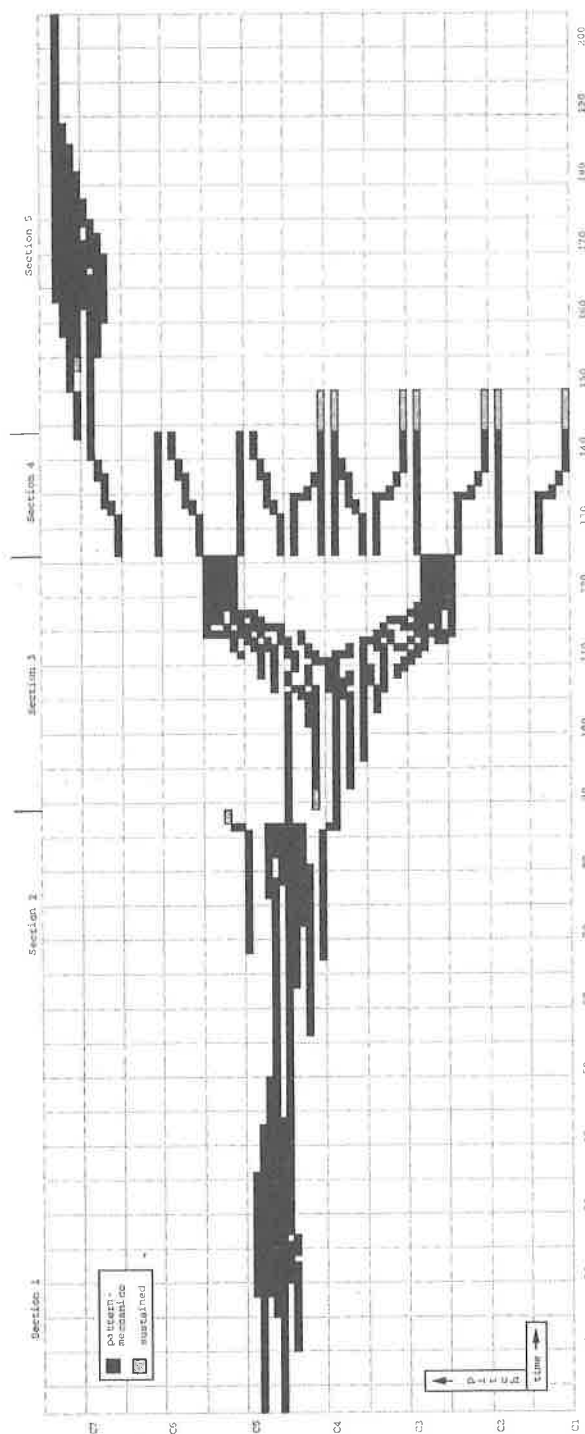
Figure 12.1: *Jane Piper Clendinning's analysis of Ligeti's* Continuum *for harpsichord*

As if to model this profound experience of the moment, his *Stimmung* (Voices, 1968), for six amplified solo voices, sustains a harmonic series for 75 minutes, with subtle timbral and textural changes produced by emphasizing the various overtones.

In addition to creating textural effects by precisely notating scores, both Stockhausen and Boulez—who, as we saw in Chapter 10, embraced some of Cage's innovations in the realm of chance music—used indeterminate means to create generalized sound masses. Boulez's *Eclat* (Brilliance, 1965) for chamber orchestra includes sections in which the conductor chooses the order of events, and others in which players are given pitches without rhythms and instructed to play "independently of the other instruments," in order to create floating moments of "amorphous time." By the end of the 1960s Stockhausen was writing scores such as *Aus den sieben Tagen* (From the Seven Days, 1968) consisting solely of written instructions for creating improvised textures. In a section entitled "Set Sail for the Sun," he instructs each member of the small ensemble to sustain a tone until they hear its individual vibrations, then to shift their attention to the overall mass of sound. All the players are then to bring their tones into "complete harmony" so that "the whole sound turns to gold, to pure, gently shimmering fire." As with Pauline Oliveros's *Sonic Meditations* (see Chapter 10), a performance of *From the Seven Days* becomes both ritual and theater.

MATHEMATICAL MODELS

In keeping with postwar efforts to align music with scientific modes of thinking, textural composers have been inspired by mathematical models derived from engineering, information theory, statistics, cybernetics, and chaos theory. Notable among the composers who prefigured such approaches was the American Conlon Nancarrow (1912–1997), who applied elaborate mathematical structures to an eclectic sound world that drew on jazz and blues piano styles. Nancarrow's Study No. 3 (1948), originally known as the Boogie-Woogie Suite, takes advantage of the player piano's precision to layer multiple ostinato patterns inspired by jazz virtuosos Art Tatum and Earl Hines, creating astonishing textures of interlocking polyrhythms.

Nancarrow explored the use of tempo canons, in which the speeds of the different voices were related according to ratios ranging from comparatively simple to mind-bogglingly complex. Nancarrow, who settled in Mexico in 1940, composed in relative obscurity for many decades until his works began to be recorded in the 1960s. His compositions and ideas influenced Ligeti and other composers, and anticipated the rhythmic complexities of the math rock associated with bands like Meshuggah and the electronic drum-and-bass music of Aphex Twin and Squarepusher.

XENAKIS AND STOCHASTIC PROCESSES

We encountered the Greek composer Iannis Xenakis in Chapter 11 in connection with Varèse's *Poème électronique* and the design of the Philips Pavilion at the 1958 Brussels World's Fair. Working with the architect Le Corbusier, Xenakis (1922–2001) used mathematical formulas for saddle-like shapes known as hyperbolic paraboloids to design the building's sweeping forms. He used the same formulas four years earlier to organize the surging masses of glissandi in his orchestral piece *Metastaseis* (Dialectical Transformations, 1954)—further evidence of his interest in fusing music, math, and architecture.

Trained as a civil engineer in Athens, Xenakis was active in the Greek resistance movement and fled to France after the war, where he worked in Le Corbusier's studio while studying composition with Darius Milhaud, Messiaen, and Pierre Schaeffer. Like Ligeti, Xenakis believed that Integral Serialism had opened up ways of hearing in terms of textures created by masses of notes. In his book *Formalized Music* (1963), he explained his conception of an integrated musical "space-time," which involved modeling mathematical probabilities for ongoing interactions of many indeterminate details. Xenakis compared such "stochastic" processes to "natural events such as the collision of hail or rain with surfaces, or the song of cicadas in a summer field" (SR 183:1374; 7/14:104). Thus his *Pithoprakta* (Actions by Probabilities, 1956), for two trombones, percussion, and strings, begins with scattered percussive sounds that gradually coalesce into complex textures. He was particularly interested in sonic phenomena, such as the sounds of a political demonstration involving hundreds of thousands of people, which could produce a "mass event" with a clearly articulated shape and form moving through time and space.

In the 1960s Xenakis began composing with computers. In addition to founding centers for "Mathematical and Automated Music" in Paris and at Indiana University, he developed a computer system in 1977 that converted drawings directly into sound, as with the score for *Mycenae-Alpha* (1978; Fig. 12.2). As the shifting shapes scroll past, they are translated into pitches in thin bands or clusters, complex mutating textures, and bursts of noise. Xenakis intended the system to make the act of composition accessible even to those without formal training; indeed, a free version known as HighC is currently available online. His software anticipated by many decades today's inexpensive graphic musical interfaces like Singing Fingers, developed at the MIT Media Lab, which enables children to finger-paint with sound.

SPECTRALISM AND ITS RESONANCES

In the 1970s a group of composers who became known as Spectralists began integrating mathematical models of timbre with principles of psychoacoustics to create luminous sound masses that surge through time and space. As with the
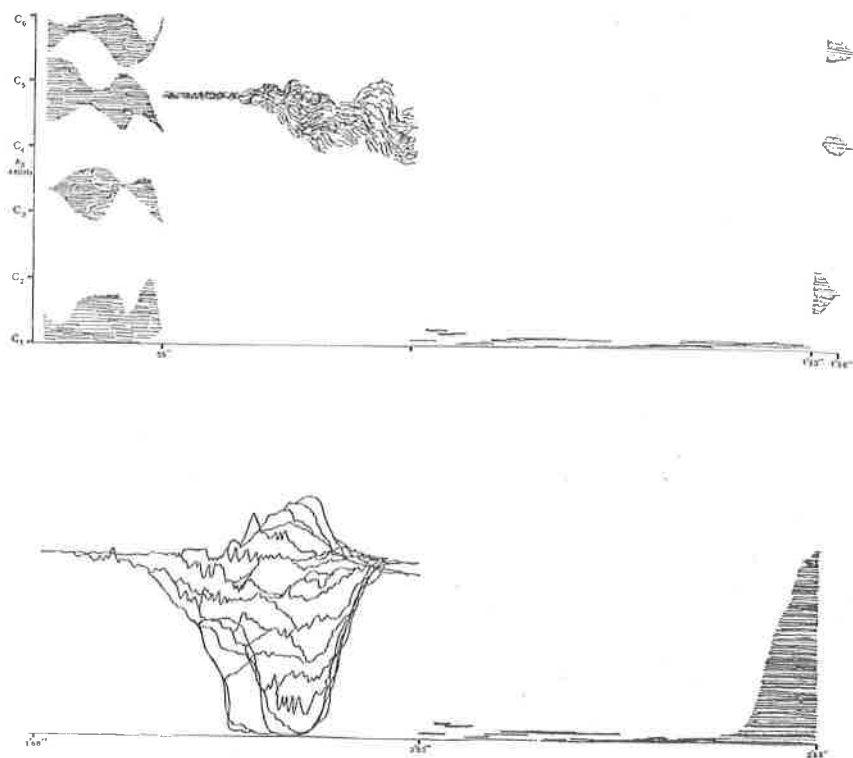
Figure 12.2: *Iannis Xenakis,* Mycenae-Alpha, *excerpt*

approaches to textural composition discussed earlier, Spectralism also emerged in part as a rejection of Integral Serialism and the various techniques that had been developed for controlling the individual musical parameters. As the British composer Julian Anderson has written, alluding to the creative process of Boulez's *Structures*: "the serial obsession with devising separate or related charts for pitch, duration, intensity, dynamics and timbre is replaced with a fondness for attempting to abolish the distinctions between these phenomena."

The Spectralists also differentiated themselves from both Integral Serialism and Indeterminacy by focusing on issues of the perceptibility of structure. The French-born composer and Messiaen student Tristan Murail (b. 1947), for example, has drawn on research in psychoacoustics and psychology to inform his compositions: "my material is neither the musical note nor musical sounds, but the sensation (sensation in a very general sense: that which is felt, in other words, perceived and interpreted) that is created by the note or sound."

As suggested by the emphasis on spectra, which could refer either to sound and timbre or to light and color, there are connections between the Spectralists and Impressionism (see Chapter 2). This is clear in Murail's *Vues aériennes*

(Aerial Views, 1986) for French horn, violin, cello, and piano. Inspired by Monet's paintings of Rouen Cathedral, capturing the play of light and shadow at different times of day, Murail "paints" four versions of the same musical object, the first seen in "morning light (clear light, very obtuse angles, maximum distortion)," the second as if through "light in the rain (soft-focus effect, sharper angles, slighter distortion)," and so on.

The often-noted quality of "acoustic glow" associated with many Spectralist works results from the close coordination of harmony (produced by the combination of individual pitches) and timbre (produced by the weighting and combination of overtones). This glow stands out vividly in *Partiels* (Partials, 1975), a piece for chamber orchestra by the French composer Gérard Grisey (1946–1998), who studied with Xenakis and Ligeti as well as Messiaen. Part of a cycle of works entitled *Les espaces acoustiques* (Acoustic Spaces, 1974–85), *Partiels* simulates the rich field of harmonics revealed through a spectrographic analysis of a low E played on a trombone (Ex. 12.2). The dramatic opening sonority and rhythmic motive are slowly destabilized over the course of the 22-minute-long piece as we experience the depths and variety hidden in a single sound.

Many Spectralist composers have been deeply involved with electronic music. Murail developed software at IRCAM for analyzing instrumental timbres and using the results to synthesize new sounds or modify live instruments. He also explored the inverse, that is the idea of imitating electronic effects with acoustic instruments: His orchestral work *Gondwana* (1980) re-creates the rich and shimmering bell sound of the analog ring modulator and some of the characteristic timbres of computer music synthesis. Murail's *Mémoire/Erosion* (Memory/Erosion, 1976), for horn and a small ensemble of strings, winds, and Ondes Martenot, imitates the increasingly chaotic effects of an analog tape-delay system (which creates echoes by sending the output of a tape machine back

Example 12.2: *Trombone harmonic series used for Gérard Grisey's* Partiels. *Arrows indicate microtonal intervals. As presented by François Rose.*

into the input). Beginning with a single note and its echoes, a complex cloud of sounds builds up gradually until it spins out of control, only to come to an abrupt stop, as if the composer had suddenly turned off the tape machine.

Other Spectralists have pursued different pathways. The Finnish composer Magnus Lindberg (b. 1958), a pupil of Grisey, began focusing on textures and the acoustic properties of harmonies as a result of his work at IRCAM in the 1980s. Lindberg also studied the works of Jean Sibelius (see Chapter 4), whose harmonies he describes as having a resonant, "almost spectral quality." Lindberg's music illustrates the connections between texture music and other recent trends. His virtuosic solo cello piece *Stroke* (1984) uses a host of extended techniques in playfully "decomposing" its dramatic opening gesture. The pervasive loops and layers in *Corrente* (1992) for chamber orchestra can be linked to Minimalism (see Chapter 14), while its quotations of Purcell, and Lindberg's use of passages from Mahler and Debussy in *Cantigas* (1999) for orchestra, exemplify the collage techniques discussed in Chapter 13.

Another Ligeti pupil, the Korean-born and Berlin-based Unsuk Chin (b. 1961), has employed Spectral ideas in pieces like *Xi* (Nucleus, 1998) for large ensemble and tape. Its soft opening sighs, synthesized at IRCAM from heavily manipulated piano pitches, gradually evolve into a richly textured haze of sound. Chin's opera *Alice in Wonderland* (2007) integrates textural approaches with more traditional techniques of melodic development. Chin has written of her works in terms of "a play of light and colours floating through the room and at the same time forming a fluid sound sculpture."

TIMBRE AND EXTENDED TECHNIQUES

PENDERECKI'S *THRENODY*

As timbre has taken center stage in textural composition, composers have begun to explore untraditional or "extended" performance techniques for instruments as well as the voice. Among the most influential works of texture music is *Threnody: To the Victims of Hiroshima* (1960) by the Polish composer Krzysztof Penderecki (b. 1933). Written for a 52-piece string orchestra, it opens with a series of shrieking clusters created by overlapping entrances of groups of instruments sounding their highest notes as loudly as possible. With a nod to Cage, Penderecki originally named the piece *8' 37"*, the length of the work as specified through its precise temporal graphic notation. After the first performances, he changed the title to *Threnody* (song of lament) for the victims of the American atomic bomb dropped on Japan in 1945, thus putting it in the category of Britten's *War Requiem* and other postwar memorial pieces. The change also reflects Penderecki's interest in connecting his music to political and social issues, an increasingly important factor over his long and prolific career.

The second page of Penderecki's score (Fig. 12.3) illustrates some of his novel string techniques and the new notational symbols that showed how to produce them. This passage begins with the violins, violas, and basses sustaining their opening clusters, some with the addition of a very slow quarter-tone vibrato. Meanwhile, each of the ten cellists is instructed to choose one of four sound patterns and play it as rapidly as possible during the 15-second block of time. Penderecki calls for various techniques of sound production, each with its own special symbol, such as bowing normally or with the wood, striking the instrument with fingertips or different parts of the bow, or playing on the short section of strings below the bridge. Instead of discrete notes and musical events, we hear a prickly sound mass moving through various registers as each section of the orchestra cycles through the patterns in turn. Penderecki also developed techniques for using contrasts in modes of sound reproduction to create large-scale form in a way analogous to the role of modulation in tonal music. Thus this passage of the *Threnody*, with its sharp attacks and highly active surface, is followed by a section that focuses on narrow clusters of sustained pitches that swell and contract.

NEW SOUNDS AND NEW INSTRUMENTS

Luciano Berio (see Chapters 11 and 13) wrote an innovative series of 14 solo *Sequenze* (Sequences, 1958–2002) employing a dramatically expanded field of instrumental and vocal timbres. Such explorations were possible only through partnerships between composers and performers who were willing to reimagine their instruments. Berio's *Sequenza No. 7* (1969) was dedicated to the pioneering oboe virtuoso Heinz Holliger, and mezzo-soprano Cathy Berberian inspired *Sequenza No. 3* (1966). Berberian further demonstrated her astonishing technique and vocal imagination in her own *Stripsody* (1966), a virtuosic showpiece that humorously brought to life the onomatopoetic sounds of comic strips.

We can see such dramatic expansions of sound in many areas of music making, including Jimi Hendrix's legendary performance of the *Star-Spangled Banner* at the 1969 Woodstock Festival, which used extensive feedback and distortion to envelop the melody in a wall of noise, while also enacting the sounds of "bombs bursting in air" to protest the Vietnam War (see Chapter 13). In the same year the American composer and jazz saxophonist Anthony Braxton (b. 1945) released *For Alto*, an album of improvisations for solo saxophone that unleashed surging masses of notes featuring extreme contrasts of register and dynamics, as well as multiphonics (a wind technique that produces two or more pitches sounding simultaneously). Braxton developed an elaborate system of sound classifications and notations for the extended techniques he used in his scores (Fig. 12.4). Influenced by Schoenberg and Stockhausen, Braxton was also shaped by his involvement in the 1960s with the Association for the Advancement of Creative

ABBREVIATIONS AND SYMBOLS

	ord.
	s. p.
	s. t.
	c. l.
	l. batt.
raised by ¼ tone	꜀
raised by ¾ tone	♯
lowered by ¼ tone	♭
lowered by ¾ tone	d
highest note of the instrument (indefinite pitch)	▲
play between bridge and tailpiece	↑
arpeggio on 4 strings behind the bridge	⫯⫯⫯
play on tailpiece (arco)	⊢
play on bridge	↑
percussion effect: strike the upper sounding board of the violin with the nut or the finger-tips	♪
several irregular changes of bow	Π V
molto vibrato	∿
very slow vibrato with a ¼ tone frequency difference produced by sliding the finger	⌇
very rapid not rhythmicized tremolo	⩘

Figure 12.3: *Krzysztof Penderecki,* Threnody: To the Victims of Hiroshima; *performance directions and p. 1 (facing)*

Musicians in Chicago, which developed distinctive black musical forms by fusing avant-garde jazz and new music. In a 1970 interview Braxton connected his use of challenging new sounds and techniques with this social and political agenda: "Consciousness is the most valuable thing that can be communicated right now—making people aware of themselves."

The German composer Helmut Lachenmann (b. 1935) has also challenged performers to break old habits by making the exploration of their instruments critical to the expressive meaning of his works. His cycle of piano pieces *Ein Kinderspiel für Klavier* (Child's Play for Piano, 1980) demonstrates the liberating potential of this idea. The fifth movement, *Shadow Dance*, requires
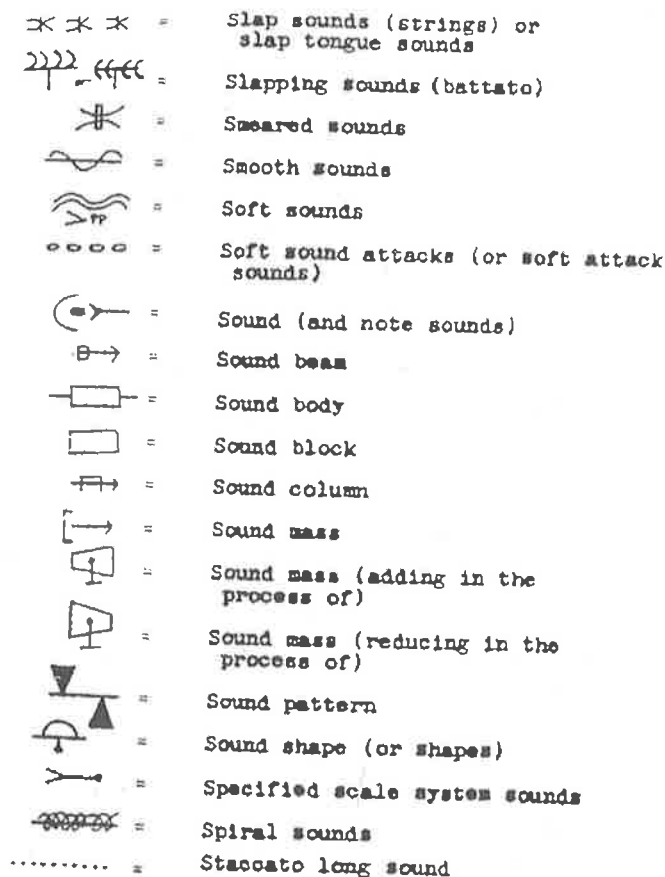
- Slap sounds (strings) or slap tongue sounds
- Slapping sounds (battato)
- Smeared sounds
- Smooth sounds
- Soft sounds
- Soft sound attacks (or soft attack sounds)
- Sound (and note sounds)
- Sound beam
- Sound body
- Sound block
- Sound column
- Sound mass
- Sound mass (adding in the process of)
- Sound mass (reducing in the process of)
- Sound pattern
- Sound shape (or shapes)
- Specified scale system sounds
- Spiral sounds
- Staccato long sound

Figure 12.4: *Anthony Braxton,* Composition Notes, *Book B, ix, composition notes*

that the pianist silently hold down a low-register cluster while playing the top two pitches in repeating rhythms, resulting in shimmering, almost electronic resonances (Ex. 12.3). Later in the piece he introduces innovative ways of using the sustaining pedal to create rhythmic patterns in counterpoint with the ostinato in the right hand. Through such simple means, Lachenmann, who has described his music in terms of "instrumental *musique concrète*," asks us to question our self-imposed limitations and the potentially repressive power of convention. A similar transgressive impulse underlies *Játékok* (Games), an ongoing series of piano pieces by the Hungarian composer György Kurtág (b. 1926). In *Bored* (1979), Kurtág depicts a child distractedly putting off practicing through a playful exploration of the keyboard, including sweeping glissandi, brash clusters, and finally, as if newly discovered, two triads.

Example 12.3: *Helmut Lachenmann,* Shadow Dance, *from* Child's Play for Piano, *mm. 1–2*

Some composers expanded the possibilities of timbre and texture still further by inventing totally new instruments. The American Harry Partch (1901–1974) dedicated much of his life to creating a hybrid art form drawing on many world traditions and involving music, drama, dance, and ritual. In his book *Genesis of a Music* (1949), he described his growing dissatisfaction beginning in the 1920s with virtually all the assumptions of Western music, in particular the limitations of equal temperament:

> The impulse to the growth and evolution of music is generated by the human ear, not by the piano keyboard, without which the harmony classes of this day and age would be inoperative. And the missing element which the human ear wants and needs most is a musical instrument capable of expressing an infinite range of ideas and of infinite mutability, so that ideas can first be tested, then proved or corrected.

In pursuit of this ideal, Partch developed various microtonal scales that could be played on adapted versions of traditional instruments; he also designed such novelties as suspended Cloud Chamber Bowls and the massive, xylophone-like Quadrangularis Reversum. These exotic-looking instruments, arranged on risers around the stage, provided both the accompaniment and the set for the ritualistic music theater work *Delusion of the Fury* (1969). Like some of the examples of extended techniques discussed earlier, Partch's highly individual body of work is notoriously difficult for others to re-create: after its premiere *Delusion of the Fury* was not performed again until 2007.

COMPOSING WITH LAYERS

In "Metamorphoses of Musical Form" Ligeti noted that serial works (like Stockhausen's *Gruppen*) and electronic music (where the early technologies required pieces to be built up in many stages on magnetic tape) exhibited a

tendency toward "layer composition." Ligeti's characterization of this idea can be applied to a great deal of textural music written in many styles: "separate layers of various different types of configuration are pressed together into a simultaneous activity" (SR 184:1382; 7/15:112).

CARTER'S DRAMATIC INTERACTIONS

The American composer Elliott Carter (1908–2012) explored a wide range of different possibilities for creating rich and shifting textures through the layering of diverse elements. In a 1963 essay published in *Perspectives of New Music*, Carter presented an overview of the music he had been hearing at Darmstadt and other major European festivals. While critical of both Integral Serialism and Indeterminacy, he was attracted to the emerging approaches to texture. He noted that in contrast to faded and thin-sounding "one-note-at-a-time" music, works featuring "thick, packed, dissonant textures and vivid juxtapositions of whole clusters or constellations of notes seem to lead, these days, to livelier results."

Reflecting his remarkable longevity, Carter's music weaves together many different threads that we have been tracing throughout this book. Growing up in New York in the 1920s, Carter was steeped in music by Varèse, Cowell, Crawford, and especially Ives, whom he came to know well. Ives's use of musical Americana influenced Carter's brashly contrapuntal *Holiday Overture* (1944). After completing his master's degree at Harvard, Carter went to Paris in the early 1930s to study with Nadia Boulanger. Echoes of Milhaud and Stravinsky can be heard in his Primitivist ballet *Pocahontas* (1939), which was premiered on the same program as Copland's *Billy the Kid*, and Boulanger's teaching shaped his Neoclassical ballet *The Minotaur* (1947).

After the war, Carter's music changed direction as he expanded his harmonic palette under the influence of Berg, Bartók, and others. Still more important was his development of new approaches to rhythm and the temporal dimensions of his works, building on techniques developed by Cowell and Nancarrow (see p. 137), and his study of jazz, Balinese, Indian, and African music. To ensure structural continuity within a flexible rhythmic style, he developed the technique of metric modulation. Analogous to harmonic modulation from one key to another, metric modulation allows precise proportional shifts in the speed of the music's perceived pulse. Carter employed this technique in many works, including his String Quartet No. 5 (1995; see Anthology 22).

Carter also developed ways of giving individual layers distinctive rhythmic profiles, creating complex textures while preserving the individuality of the various voices. In large-scale works like the Double Concerto (1961), which features two timbrally distinct instrumental ensembles, he approached layering as if he were creating different characters in a drama who act out scenarios based on their own personalities and mannerisms. Dramatic interaction is cen-

tral to the String Quartet No. 5; Carter described its form and content in terms of a chamber music rehearsal in which the players "try out fragments of what they later will play in the ensemble, then play it, and then stop abruptly to discuss how to improve it." He differentiates the four instrumental layers through the intervals they play, their dynamic levels, and their characteristic modes of sound production. Carter emphasizes special timbral effects like the snap pizzicato, where the plucked string is made to strike the fingerboard. Moreover, each of the quartet's main movements focuses on a single technique (such as harmonics, pizzicato, and legato), as if the characters had come to a momentary consensus about how to proceed.

STRATEGIES OF STRATIFICATION

Layered textural effects can be found in diverse musical contexts and in many different musical trends and styles. The British composer Harrison Birtwistle (b. 1934), for example, has described his music in terms of geological strata; the topographical layers in his orchestral piece *Earth Dances* (1986) are differentiated by means of rhythm, timbre, instrumentation, and diverse musical styles. An even more dramatic eclecticism defined the music of the Canadian-born American composer Henry Brant (1913–2008). Inspired by Ives's use of space in works like *The Unanswered Question* and the Fourth Symphony, in *Antiphony 1* (1953) Brant divides the orchestra into five ensembles—strings, French horns, muted brass, woodwinds, and percussion—that are placed as far apart as possible in the performance space. With connections to the use of quotation and collage we will consider in Chapter 13, in other pieces he created complex polyphonic textures by combining different styles and world music traditions; his *Meteor Farm* (1982) includes layers featuring gamelan, West African singing and drumming, Indian vocalists, a jazz band, orchestra, choruses, and soloists.

The Russian composer Sofiya Gubaydulina (b. 1931) uses textures and layers to create intensely expressive works, often infused with mysticism and religious symbolism. Extended techniques and microtonal effects play a key role in many of her pieces. In *Music for Flute and Strings* (1994), for example, the two layers of music are separated by a quarter tone, as if one were shadowing the other. In a 1995 interview she critiqued what she described as a pervasive overcomplication in twentieth-century music in the movement "from atonality and serialism to sonorism," paralleled by the limitless expansion of the world of possible sounds.

Rather than emphasizing still more new possibilities, Gubaydulina has worked "to cure the excessiveness of musical material" by carefully controlling rhythm, time, and form. The choral cycle *Now Always Snow* (1993) illustrates what she calls her "method of time structuring," a set of tools for shaping individual

layers, controlling points of arrival, and determining the overall proportions of a piece, which are often based on the Fibonacci sequence. Her second violin concerto, *In tempus praesens* (For the Present Time, 2007), explores manifold ways of layering the solo line within heterophonic echoing effects, driving rhythmic clusters, and shimmering or skittering sound masses. Gubaydulina writes of trying to capture an intense and lasting experience of the present moment, one that is accessible "only in sleep, in the religious experience and in art."

As we will see in Chapter 14, the multiple ostinati of Minimalism and Postminimalism exemplify layer composition. The widespread use of music software such as Garage Band, Pro Tools, Reason, and Live has made it almost second nature for composers in some styles to stack up layers of repeating samples and loops. This is particularly true of hip-hop production; a transcription of the complex polyrhythmic groove used throughout Public Enemy's *Fight the Power* (1990) shows prominent samples of James Brown's voice and a much-sampled break from his *Funky Drummer*, along with over a dozen samples from Afrika Bambaataa, Sly and the Family Stone, and others (Ex. 12.4).

Example 12.4: *Public Enemy,* Fight the Power, *opening groove. Transcription by Robert Walser.*

That texture music ultimately represents a way of hearing and thinking about sound that can be applied to any context is clear from a piece like *9 Beet Stretch* (2002) by the Norwegian sound artist Leif Inge, which uses software to slow down a recording of Beethoven's Ninth Symphony so that it lasts 24 hours. The process results in slowly evolving masses of sound and shifting timbres, as if unveiling a work of texture music hidden between the notes in Beethoven's original score. A similar revelation takes place in Hans Zimmer's textural soundtrack for the movie *Inception* (2010), which features a sample of Edith Piaf's signature song "Non, je ne regrette rien" slowed down into an ominous, murky cluster. We will return in Chapter 15 to the breakdown of distinctions between composed works and the sounds of the world around us. In his book *The Tuning of the World* (1977), the Canadian composer R. Murray Schafer described our "soundscape" as a kind of ongoing texture music. "The world is always full of sounds," Schafer wrote. "They come from far and near, high and low; they are discrete and continuous, loud and soft, natural, human, and technological."

FOR FURTHER READING

Adlington, Robert, *The Music of Harrison Birtwistle* (Cambridge: Cambridge University Press, 2006)

Carter, Elliott, "Music and the Time Screen," in *Elliott Carter, Collected Essays and Lectures 1937–1995*, edited by Jonathan W. Bernard, 262–280 (Rochester: University of Rochester Press, 1997)

Drott, Eric Austin, "Ligeti in Fluxus," *Journal of Musicology* 21 (Spring 2004): 201–240

Fineberg, Joshua, ed., "Spectral Music I–II," *Contemporary Music Review* 19, nos. 2–3 (2000)

Gable, David, "Boulez's Two Cultures: The Post-War European Synthesis and Tradition," *Journal of the American Musicological Society* 43, no. 3 (Autumn 1990): 426–456

Gann, Kyle, *The Music of Conlon Nancarrow* (Cambridge: Cambridge University Press, 2006)

Lochhead, Judy, "Hearing Chaos," *American Music* 19, no. 2 (2001): 210–246

Mirka, Danuta, "To Cut the Gordian Knot: The Timbre System of Krzysztof Penderecki," *Journal of Music Theory* 45, no. 2 (2001): 435–456