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Erik Christensen, *The Musical Timespace: A Theory of Music Listening*.
Aalborg, Denmark: Aalborg University Press, 1996. 174 pp. (vol. 1), 67 pp. (vol. 2). ISBN 87-7307-525-6. \$45.83.

The main purpose of this book is to define a theory of listening that can be applied to contemporary music. Its goals are to close the gap between theories of classical music and theories of contemporary music and to "il-

luminate connections between music theory and the findings of research in music psychology" (p. 8). The book is presented in two volumes. The first volume describes the content of the theory in nine chapters. The second volume contains notation examples and graphs of numerous 20th century music pieces (by Xenakis, Ives, Reich, Lutoslawsky, Ligeti, Messiaen, Schoenberg, Langgaard, Nielsen, and Nørgård). Some pieces in other styles are also discussed (Beethoven's "Eroica," Pink Floyd's "Set the Controls for the Heart of the Sun," and Coleman Hawkins's "Body and Soul"). The reader is invited to follow Christensen's analyses of these works by listening to specific performances (most of them available on CD), in addition to reading the scores. Christensen's purpose is not to discuss the influence of specific performances on music listening but to indicate the time points of specific passages of interest in the musical flow.

The core of the theory is developed in Chapter 1 ("The Basic Listening Dimensions"). The starting point is that hearing is not designed for music listening but for survival in a natural environment (p. 10). Three main perceptual abilities are postulated: attention, sound identification, and sound localization. Corresponding to these are three basic listening dimensions: intensity (which arouses attention), timbre (which enables sound identification), and space (which provides spatial cues for localizing sounds). These are said to be "experienced instantly and simultaneously; they are microtemporal listening dimensions, within a fraction of a second providing information about the relation between the listening body and mind and the surrounding world" (p. 12).

After having detected, identified, and localized the sound events, the listener needs to perceive where the sounds are moving. In a very brief discussion, Christensen emphasizes the role of short-term memory and then concludes: "Estimations of sound movement in memory evoke the concepts 'before', 'during', and 'after', which are integrated in the idea of durations. This implies that movement is one of the essential factors underlying the sensation of time. The other essential factor is pulse" (p. 13). Movement and pulse are described as macrotemporal dimensions that represent two kinds of awareness: the awareness of change (movement) and the awareness of regularity (pulse).

According to Christensen, space, timbre, intensity, movement, and pulse are the five basic listening dimensions essential for survival and also for music listening. In music, the spatial dimension is mostly represented by pitch height. This is not to say that pitch height is a natural basic element. On the contrary, Christensen affirms that "timbre is the substance of music, and pitch height is an aspect of timbre" (p. 16). Pitch height is a culturally evolved notion that gained its importance through a learning process. The inclusion of pitch height as a spatial dimension confers interesting qualities on the model. Indeed, pitch height and pulse are opposed in the model: Very low frequencies (below 16 Hz) are heard as pulse and higher ones as

pitch. This reflects "the fact that pitch height and pulse are related to the fast and slow ends of the physical continuum" (p. 19). Similarly, "movement and timbre are placed opposite each other as the slow and the fast end of a motion continuum" (p. 19). There is no definite threshold between the microtemporal experience of a characteristic timbre and the macrotemporal experience of sound movement. Christensen's theory thus links the microtemporal and macrotemporal dimensions in a temporal continuum. The combination of the five basic listening dimensions leads to the definition of three secondary listening dimensions: Harmony derives from timbre and pitch height, rhythm from pulse and movement, and melody integrates pitch height and movement. Micromodulation is introduced in Chapter 8 as a fourth secondary listening dimension that derives from the interaction between timbre and pulse.

At this point in the book, the author should have explained how each of the eight following chapters will further address the theory. Unfortunately, such indications are missing; Christensen mentions only that "timbre, harmony and pitch are discussed in chapter five, movement, rhythm and melody in chapter six" (p. 21). The overall structure of these chapters still remains unclear even when the entire book has been read.

In Chapter 2 ("States, Events and Transformations"), the author introduces in a very intuitive manner the central concept of musical space. Ligeti's "Atmospheres," he says, "is a flow of sound. Subtle changes in timbre, intensity and movement create auditory impressions of variable sound masses appearing and disappearing, approaching, passing and withdrawing. . . . This music creates impressions of height and depth, distance and proximity, transparence and density, brightness and darkness, stasis and motion. . . . Sharply attacked tones seem to protrude, softly initiated sounds seem to emerge far away or at an infinite distance. Crescendos create the impression of sound coming nearer, diminuendo sounds seem to move away" (pp. 29-30). The virtual space evoked by music is the theme of Chapter 3 ("Space, Time, Flow and Memory"). According to Christensen, "Music sounds compete with sounds of the surrounding world." When music wins the competition, "the auditory images of the real world are eliminated, and a virtual musical space is evoked in the listening mind" (p. 40). The remainder of the chapter contains general considerations about the memorization of the listening dimensions. Unfortunately, the author does not discuss in detail how this virtual space emerges in listeners' minds.

Chapter 4 ("Time, Space and the Environment") revolves around the notion of musical timespace. The first part is a general discussion about musical time. In the second part, the author describes his own experience of musical space in several pieces by Ives, Schoenberg, and Langgaard. The

chapter ends with the assertion that musical timespace is not the addition of two separate concepts, "space" and "time", but results from the integration of temporal and spatial factors. In Chapter 5 ("Microtemporal Listening Dimensions: Timbre, Harmony, and Pitch Height"), the multidimensional nature of timbre is discussed, and Christensen emphasizes the interdependency of timbre and pitch height ("Pitch height arises as a focusing quality of timbre," p. 74) and between timbre and harmony ("Harmony is an emergent quality of timbre," p. 75). This interdependency permits a gradual transition and fusion between timbre, pitch height, and harmony, a fact that is illustrated by the description of several musical pieces in the remainder of the chapter.

Chapter 6 ("Macrotemporal Listening Dimensions: Movement, Pulse, Rhythm and Melody") develops the idea that "rhythm is the temporal shape of movement" (p. 91), and that "melody is a spatial shape of movement" (p. 98). It closes with an intriguing correspondence between listening dimensions on one hand and change and regularity on the other hand: Timbre represents microtemporal change; pitch height, microtemporal regularity; pulse, macrotemporal regularity; and movement, macrotemporal change. In Chapter 7 ("Density, Extension and Color of the Soundspace"), the author addresses the qualities of the total soundspace, its size and shape, transparency, density, and color, and he discusses the relationships between the spatial and temporal qualities of music. The total soundspaces evoked by different pieces are described in detail. As a major conclusion it is argued that "the total soundspace of music consists of streams, layers and impulses of timbre superimposed on each other. The superimposition results in microtemporal and macrotemporal patterns of change and regularity, density and transparency, continuity and discontinuity" (p. 143).

In Chapter 8 ("Micromodulation") a new listening dimension is introduced that derives from the interaction of timbre and pulsation. Several examples of micromodulations (vibrato, tremolo, interference, distortion) taken from different musical pieces are described. Micromodulations contribute to the fusion of spectral components and thus make it possible to separate sound events from each other. In so doing, "micromodulation of timbre creates the microspace of an individual entity within the multiplicity of sound in the total soundspace" (p. 149). The book ends with a final chapter of 2 pages ("A Model of the Musical Timespace") that recapitulates the main ideas of Christensen's model. "The virtual space of music is evoked as a mental illusion by sequences and patterns of differences in the microtemporal and macrotemporal dimensions. The impression of a virtual macrospace is evoked by the illusion of movement and the experience of a vertical continuum of high and low pitch. The impression of a

microspace of a single sound source which can be distinguished from other sound sources is evoked by a particular pulsation and micromodulation of timbre" (p. 152).

Music is a complex subject that can be discussed in a number of ways. None of these discourses is a priori better or more useful than any other. Scientific approaches provide well-formed accounts of several aspects of music but fail to investigate others that may be better understood within a less rigorous framework. It is likely that the confrontation of different approaches contributes to our understanding of music. To be constructive, however, each of them must make clear its own theoretical foundations and methods. From this point of view, Christensen's book is seriously deficient. First, it does not really present a theory: No attempt is made to formalize the concepts used, or to indicate how these concepts may operate to explain musical intuitions experienced by listeners. Readers expecting to find in Christensen's book a theory as well developed as that of Lerdahl and Jackendoff (1983) will be very disappointed. Second, Christensen's "theory" is not a theory of music listening. Of course, his comments derive from listening to contemporary musical pieces ("repeated listening is the basis of musical insight", p. 8), but these comments tell us nothing about how the mind processes musical events and structures.

What Christensen really has done is to set forth notions that seem to him to be useful in describing phenomenological aspects of music listening, without investigating in detail the perceptual processes that govern these phenomena. None of the current issues concerning the processing of pitch height, rhythm, timbre, musical form, or sustained attention are invoked. Christensen's book presents folk psychology entirely based on intuitions. That these intuitions may be shared by several composers (even famous ones) does not confer any kind of explanatory power on the "theory." Saying that human beings are clever because they are governed by sophisticated cognitive processes is not an explanation. Similarly, saying that the "virtual musical timespace is evoked by the experience of sequences and patterns of differences in timbre, pitch height, movement and pulse" (p. 152) does not form a theory of music listening.

The author seems to be unaware of what a scientific theory of (music) perception should be like. Very important contributions to the field of music cognition are not quoted: For example, there are no references to Lerdahl and Jackendoff's (1983) *Generative Theory of Tonal Music*, to Bregman's (1990) *Auditory Scene Analysis*, Krumhansl's (1990) *Cognitive Foundations of Musical Pitch*, Jones' (1987) theory of dynamic attending, and several other important books or articles published in the past decade. As a consequence, the present book also fails to bear out one of the author's main goals: "to illuminate connections between music theory and the findings of research in music psychology" (p. 8). To achieve this ambition, it

would have been necessary, for example, to discuss the central concept of timespace [which "refers to the integration of temporal and spatial factors. . ." (p. 67)] in light of current research in music psychology that has challenged this integrative conception (see Peretz & Morais, 1989).

A final major problem with Christensen's theory is that it is not a theory of (contemporary) music. Of course, several 20th century pieces are used to illustrate certain concepts of the "theory." But the main goal of music theory cannot be simply to indicate that the concepts it contains describe some audible features of musical pieces. A music theory should illuminate interesting facets of individual pieces, or provide new insights into the style of a composer, or about the musical language of a group of composers. Christensen's theory relies on intuitions that are too naive to fulfill these aims. Let us consider, for example, the following analysis of the beginning of Xenakis's "Metastasis": "0'00-1'32: An initial tone appears; continuous gliding movement in strings, interspersed with attacks of wooden percussion, spreads out fan-like upwards and downwards, reaching a climax in a mass of sound, consisting of a high and low part (1'00-1'19), during which percussion and plucked string attacks are heard. At 1'20 the sound masses are set in intensified vibration by tremolo; sudden breakoff at 1'32. 1'32-2'26: Tinkling metal percussion breaks the brief silence, 1'37 followed by sheets of string tremolo, changing suddenly in loudness several times. 1'42 Deep trombones emerge, . . ." (p.24). Such a discourse does not analyze the piece; it is an elementary chronological description of the musical events. Examples of this sort are numerous in Christensen's book. They do not capture specific features of the pieces, nor of the style of the composer, and they do not describe the impressions the piece makes on listeners.

These descriptions are no more relevant for contemporary music than for baroque, classical, romantic, or even non-European styles. Let us consider the analysis of Pink Floyd's "Set the Controls for the Heart of the Sun": "0'00- 53: In the beginning of the piece, the listening dimensions are activated one by one. 0'00 Intensity and metallic timbre of a cymbal emerges and grows. 0'03 Pulse emerges in the cymbal timbre, and the space is filled by the rapid growth of timbral intensity. 0'10 The timbre is set in vibration, 0'18 a deep sustained tone is added. 0'28 movement and melody appear in a repeated slow motion melodic formula. 0'33 Rhythm is added in a repeated drum patter. 0'38 The melodic formula is doubled by a higher instrument. Melodic movement in parallel octaves evokes the impression of a transparent space. . . ." (p. 125). What such analyses are supposed to demonstrate remains obscure. It would have been more interesting to explain how each piece, depending on its style, manages to create specific virtual musical spaces in listeners.

To conclude, I believe that anyone interested in this book should skip the preface and ignore the ambitious claims made there by the author. His

“theory” is nothing but a set of intuitions about music listening. This is not to say that these intuitions are worthless. They are not sufficiently elaborated to form a theory, but they can stimulate the reader to reflect upon music analysis and listening.¹

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