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Introduction: 'Sound for the Sake of Perceptual Insight'

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In August 2006, the new music world lost one of its most adventurous and brilliant composers. James Tenney (1934 – 2006) was a pioneer of computer music, the author of witty yet profound verbal scores, and a composer of everything from piano rags to orchestral explorations of subtle microtonal harmonies. A more diverse or accomplished *oeuvre* is hard to imagine: Tenney was driven by a constant curiosity about the universe, describing himself as 'a composer and amateur cosmologist' (Polansky, 2006). Tenney's work is concerned with the nature that we perceive, and with the very nature of our perception itself. He characterized his music as

> sound for the sake of perceptual insight—some kind of perceptual revelation. Somehow it seems to me like that's what we're all doing—searching to understand our own perceptual processes. In a way, science is about the same thing, but its enterprise seems to be to understand the nature of reality through thought and intellection. It seems to me art is about understanding reality to the same extent—but through a different modality: perception. (Tenney, 1978)

The paths of science and art crossed frequently in Tenney's work. In his first book, *META + HODOS* (from the Greek roots of 'method', which Tenney translated literally as 'along the way'), he applied the principles of Gestalt psychology to the new musical materials of ground-breaking twentieth-century composers like Ives, Schoenberg, Webern, Varèse and Ruggles. The early 1960s found him researching computer music and sound generation at Bell Labs while participating in New York's avant-garde art world, collaborating with artists including Carolee Schneemann, George Brecht, Charlotte Moorman and Nam June Paik.

In the mid-1960s, Tenney's music moved towards an increasing economy of musical notation and gesture, renouncing the dramatic, dialectical forms typical of Western music. In pieces like the postcard scores *KOAN* and *Having Never Written a Note for Percussion*, the entire form is the unfolding of a single, simple shape. These works are not 'expressive' or 'dramatic' in the traditional sense; rather, they set up a largely predictable process which, nonetheless, can often contain startling moments

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of beauty and wonder. Such monolithic works bring the listener into a direct confrontation with sound itself, unencumbered by the emotive associations of a more traditional aesthetic.

Tenney's theoretical inquiries, exploring both the physics of sound and the psychology of musical perception, were a constant companion to his compositional work. These inquiries inspired works exploring psychoacoustic phenomena like the endlessly ascending Shepard tone and the beating heard between mistuned pitches (*For Ann (rising)* and *Beast*). A fascination with the perception of pitch led Tenney to adapt and expand the theories of Harry Partch, whose microtonal tunings took the pure, just intonation intervals of the overtone series as a departure point. Tenney came to see the overtone series—and the just intonation intervals between its members—as the only cognitive 'givens' in our perception of musical pitch. Since the early 1970s, many of Tenney's works have explored this rich harmonic world, often combining just intonation harmonies with formal structures drawing on the Gestalt ideas first proposed in *META + HODOS*. Despite the role of theoretical ideas at the genesis of many of Tenney's works, his works never fall into academic dryness; rather, their integrity of purpose and novelty of means invite us to meet the sonic world with the same great curiosity and enthusiasm that Tenney brought to every project.

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In tribute to Tenney's remarkable musical accomplishments, this special issue of *Contemporary Music Review* brings together articles on Tenney's music by musicologists and composers, including several of his former students and colleagues. The articles range from aesthetic reconsiderations to detailed analyses of specific works and compositional extensions of Tenney's ideas. An important theoretical article by Tenney, 'On ''Crystal Growth'' in Harmonic Space', is published here for the first time in English. Also, in a 2006 interview with Donnacha Dennehy, Tenney looks back on his compositional career, with emphasis on his various approaches to intonation and the influence of Harry Partch and John Cage.

Tenney's close engagement with the music and ideas of other composers is explored in Bob Gilmore's article 'James Tenney and the Poetics of Homage'. A large proportion of Tenney's compositions bear dedications to other composers—from the 1959 *SONATA for Ten Wind Instruments*, dedicated to Carl Ruggles, to more recent works like '*Scend for Scelsi* and *Song'n'Dance for Harry Partch*. Gilmore proposes that Tenney's work creates 'an ecology of ideas, where techniques and inventions of other composers are rationalised, restated in different terms, and sometimes playfully juxtaposed with ideas of others'. While the frequency of dedications to other composers has typically been taken as a sign of friendly collegiality, Gilmore suggests that it may also be a sign of anxiety about the precarious position of the contemporary composer; through his dedications, Tenney constructs a virtual creative community where even apparent opposites like Cage and Partch can be reconciled.

Brian Belet's article 'Theoretical and Formal Continuity in James Tenney's Music' explores the interplay of theory and composition throughout Tenney's career. As Belet writes: 'Each composition grows out of the need to address one or more specific formal questions: each work is indeed an experiment designed to explore the inherent ramifications of a theory, and subsequent compositions address questions generated by earlier works'. In this cycle of experimentation and theorizing, a thread can be traced linking the 1961 *Noise Study* to the 1971 'Postal Pieces' *Beast* and *KOAN*, and even to works of the 1980s like *Glissade* and *KOAN for String Quartet*. Perhaps, muses Belet, drawing on Tenney's terminology from *META + HODOS*, these works from across Tenney's long career can be understood as a unified 'temporal gestalt unit' at the most global level.

An example of Tenney's evolving theoretical work is 'On "Crystal Growth" in Harmonic Space'. The article is based on the elegant model of harmonic space proposed in Tenney's 1984 article 'John Cage and the Theory of Harmony'. While spatial analogies for harmonic structure are a frequent feature of contemporary music theory, Tenney's model is deeply grounded in harmonic perception. He uses spatial dimensions to represent the prime factors of just intonation interval ratios; thus, two dimensions suffice to display a Pythagorean pitch world with factors of 2 and 3, while Harry Partch's 11-limit just intonation would require five dimensions: one for each of the prime factors 2, 3, 5, 7 and 11. Distances in harmonic space are measured by a formula that takes into account both the number and complexity of harmonic steps between two pitches.

Putting his metric of harmonic distance to the test, Tenney explores the growth of 'crystals' in harmonic space. Beginning with a single pitch, new pitches are added to the crystal so that each new point has 'the smallest possible *sum of harmonic distances* to all points already in the set'. Not surprisingly, the first addition is an octave away from the original pitch; the octave is the simplest ratio, 2:1, and therefore the shortest harmonic distance. As the crystal grows, there are 'critical points' where growth into a new harmonic dimension creates a more compact crystal than continuing in the established dimensions. At a certain point, a crystal growing in Pythagorean 2,3-space will expand into a new dimension, adding the prime factor of 5; the behavior of the crystal thus mimics the historical expansion of harmonic resources by Renaissance theorists like Ramis de Pareia. When the crystal has expanded to a full chromatic scale in 2,3,5-space, a few more steps bring it to yet another 'critical point'—here, the next step is expansion beyond traditional tunings to what Ben Johnston calls 'extended just intonation'.

Tenney's article only follows the growth of harmonic crystals to the 7-dimension, but the process of crystal growth is theoretically open-ended. Growth into higher dimensions is taken up in Marc Sabat's 'Three Crystal Growth Algorithms in 23-limit Constrained Harmonic Space'. Sabat contemplates the growth of these crystals as they take on additional prime factors, and describes the use of one of these crystals as the basis for his piano trio *reminded of charlemagne palestine*.

The 2006 interview between Tenney and composer Donnacha Dennehy begins with a discussion of the role of the harmonic series in Tenney's music—a lifelong preoccupation beginning with the 1972 orchestra work *CLANG*. Tenney describes the variety of microtonal notations he used over his career, from combinations of up and down arrows into 'Christmas trees' to specifying precise intonational inflections in cents (hundredths of a semitone). Dennehy brings up the interesting parallels between Tenney's music and that of European 'spectral' composers like Gérard Grisey and Tristan Murail, who also began working with harmonic series in the early 1970s. Despite many shared theoretical preoccupations, Tenney notes that his formal aesthetic is quite different than that of the European spectralists, whose work he describes as based on 'all the old assumptions about how the form of the piece needs to be full of surprising, unexpected changes, keep you on the edge of your seat and stuff like that'. The alternative offered by Tenney's approach to 'spectralism' is an intentionally non-dramatic form—a form that allows the listener to 'sit back and relax and get inside the sound'.

Robert A. Wannamaker explores the idea of Tenney as a 'spectral' composer in 'The Spectral Music of James Tenney'. While European spectralism has received widespread attention, Wannamaker points out that since the early 1970s, there has been a parallel, 'relatively undocumented North American school of spectral music composition'. Tenney's 'spectral' ideas include the use of overtone-based sonorities in *CLANG* and *QUINTEXT V: SPECTRA for Harry Partch*—both composed in 1972, thus anticipating seminal European spectral works like Grisey's 1975 *Partiels*. Other spectral features of Tenney's music are the use of rhythmic analogs of spectral structures (as in *Spectral CANON for CONLON Nancarrow*) and speech-modeling through the imitation of vowel formants in *Three Indigenous Songs*. The detailed analyses here include an exploration of the 2001 composition *Spectrum 6*, which uses computer algorithms to randomly determine the progress of the music within strictly controlled parametric limits.

Tenney's last composition, *Arbor Vitae* for string quartet, was finished with the help of composer Michael Winter in the summer of 2006. Like *Spectrum 6*, *Arbor Vitae* is based on the use of algorithms to determine the evolution of various parameters of the music. In his contribution to this issue, Winter describes the processes underlying the work, providing a close look at Tenney's musical tools and techniques. Though the compositional process embraced chance at a local level, it was Tenney's practice to fine-tune the constraints of his random processes until he was satisfied that they would consistently yield the kind of result that he sought. He once described seeing the same kind of global order with local randomness in a variety of natural phenomena: 'I think the real world's textures—or textures that have this character—are beautiful: the stars in the sky, the leaves on the trees, the noise of the traffic on the street corner, the birds in the forest, etc. These are beautiful textures to me' (Tenney, 2000). In seeking to reflect this kind of natural beauty in *Arbor Vitae*, Tenney draws on his theories of harmonic perception to create a powerful 'perceptual revelation'; Winter describes how as the piece progresses, the complex relationships

between pitches are gradually revealed as part of an overtone series on a single fundamental: 'Whereas at the beginning, only the outermost branches are heard, by the end, we hear the entire ''tree'''.

This volume concludes with a comprehensive catalog of Tenney's works and a bibliography of his published writings. In the course of collecting and assembling all of the pieces of this tribute to James Tenney, I have been struck by the passion all the contributors have for Tenney's music. The influence of Tenney's work on this circle of musicians and composers is considerable, though his music has not yet received the more widespread recognition that it so thoroughly deserves. It is my hope that the articles collected here will introduce a new audience to Tenney's remarkable and beautiful music, and perhaps to some 'perceptual revelations' of their own.

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