

Parallels to Spectralism in the United States

Robert Hasegawa, robert.hasegawa@mcgill.ca

Published as “Aux États-Unis, des Voies Parallèles au Spectralisme” (translated by Jean-François Cornu) in *L’Étincelle: Le Journal de la création à l’IRCAM* 1/1 (November 2006), 4–7.

As spectral music makes its way into American concert halls, many fans of contemporary music are finding that certain of its preoccupations are surprisingly familiar. While many aspects of spectralism are new to listeners in the United States, some of its musical and sonic ideas have been central to American composers for decades.

In an essential statement of the spectral aesthetic, Gérard Grisey wrote in 1984, “we are musicians and our model is sound, not literature, sound, not mathematics, sound, not theater, plastic arts, quantum theory, geology, astrology, or acupuncture.”¹ If the most characteristic trait of spectralism is the use of sound itself as the source for musical material and inspiration, then American music in the last century has given rise to many “spectralists”: composers fascinated by such acoustical phenomena as the overtone series, beating, and combination tones. The American “spectralists,” though, developed in a very different artistic and intellectual climate than did Murail and Grisey, and were deeply influenced by their encounters with historical tuning systems, Asian musics, conceptual art, and minimalism.

Just as the spectralists turned to “sound itself” as a reaction against the abstractions of serial music, the self-taught American composer **Harry Partch** (1901-1974) felt that a close examination of physical sound could help revive a tradition mired in convention and alienated from its own basic material: “It need hardly be labored that music is a physical art, and that a periodic groping into the physical... is the only basic procedure, the only way a music era will attain any significance.” Partch complained that by using equal temperament (the division of the octave into twelve equal parts) rather than just intonation (the traditional tuning of musical intervals as whole number vibration ratios), Western music had become an “art of sound that denies sound.”²

Just intonation is based on the natural intervals found between the pitches of the overtone series, an essential component of spectral technique. In equal temperament, these ideal just intervals are only available in out-of-tune, approximate versions—keyboard tuners sacrificed accuracy in intonation for the flexibility to change keys. Partch extended the Renaissance version of just intonation—which used only ratios built from multiples of the prime numbers 2, 3, and 5—by introducing higher primes such as 7 and 11. These new numbers create intervals that have the smooth quality of the traditional just intervals, but have never been part of standard Western musical theory—for example, the flat natural seventh (7:4) or the flat augmented fourth (11:8).

Because of the difficulty of accurately reproducing his new intervals on traditional instruments, Partch built his own: an exotically-named collection including the Chromelodeon, Harmonic Canon, Kithara, Spoils of War, Zymo-Xyl, Cloud Chamber Bowls, and Diamond Marimba. The Diamond Marimba was designed to reflect Partch’s basic harmonic idea, the Tonality Diamond: a matrix of interlocking “Otonalities” (chords based on the overtone series) and their inversions, “Utonalities.” (Grisey contrasted Otonalities and Utonalities in his 1983 *Anubis-Nout*.)

¹ Gérard Grisey, “La musique: le devenir des sons,” *Darmstädter Beiträge zur Neuen Musik* 19 (1994): 22, translated in Daniel Pressnitzer and Stephen McAdams, “Acoustics, Psychoacoustics, and Spectral Music,” *Contemporary Music Review* 19/2 (2000): 58.

² Harry Partch, “Show Horses in the Concert Ring,” *Circle* 10 (Summer 1948), 43-51, reprinted in *Bitter Music: Collected Journals, Essays, Introductions, and Librettos* (Urbana and Chicago: University of Illinois Press, 1991), 176-179.

Partch referred to his concept of a more natural and body-centered music as *Corporealism*. He often returned to the aesthetic ideas of ancient Greece (where much of his tuning theory originated), particularly the importance of the voice in music—we can see this in dramatic works like *Revelation in the Courthouse Park*, a retelling of Euripides's *Bacchae* complete with Greek chorus. Partch's vocal compositions combined his extended just intonation with a speech-like delivery—among his many vocal works are settings of hobo texts gathered during his own Depression-era wanderings.

Partch's music and theories influenced younger composers, including **Lou Harrison** (1917-2003). Harrison received a copy of Partch's book *Genesis of a Music* in 1949, and soon began to incorporate just intervals into his work. Unlike Partch, Harrison continued to compose for standard Western instruments, using a less densely microtonal pitch language—Harrison, as the musicologist Bob Gilmore has pointed out, uses just intonation more for the uniquely limpid and transparent sound of its intervals than to add more pitches to his palette.³ Many of Harrison's works demonstrate his attraction to Asian music—in particular the gamelan of Bali and Java. Like Partch, Harrison also built his own instruments, based on the gamelan but in just intonation. Harrison called the just intervals the only “real intervals” and linked equal temperament to the conformity and repression of modern society.⁴

The composer **Ben Johnston** (b 1926) worked closely with Partch as an apprentice; for about six months in 1950-51, Johnston and his wife lived in Partch's primitive studio in Gualala, California, tuning Partch's unique instruments and learning to play them. Johnston sought a reconciliation of extended just interval with the western tradition—he composed for standard Western instruments, and was even comfortable using serial procedures in combination with his just intervals. Johnston has frequently referred to the music of Debussy as an inspiration—according to Johnston, Debussy's harmonic language “approximates as well as can be in equal temperament a movement from overtone series to overtone series, with an emphasis on higher partials.”⁵ In his compositions, Johnston calls for precise tuning of complex just intervals, using a detailed system of new accidentals.

Ezra Sims (b 1928) arrived at a musical language comparable to that of Johnston and Harrison through independent research and experimentation. Rather than notating precisely-tuned just intervals as ratios, Sims works within a equal-tempered system of seventy-two notes per octave—every semitone is divided into six equal parts. In practice, the divisions of the semitone are so fine that every just interval can be closely approximated—and Sims expects that players will be able to make small adjustments as they play to make the intonation still more exact. Sims uses an eighteen-note subset of the seventy-two pitches in each octave as a scale (analogous to the diatonic scales of traditional Western practice with additional microtonal pitches); within this system he can gracefully “change keys,” pivoting from one scale to another. Many of Sims's harmonies are based on combination tones (tones can be heard when two tones are combined, but which are not physically present in the air's vibrations). This effect is closely related to the “ring modulation” procedures adopted by some spectral composers.

The practice of these four just intonation composers remains quite distinct from the aesthetics of spectralism—although their use of just intervals demonstrates a related interest in the physicality of sound. Though the use of natural sonic phenomena is key to the movement, spectralism is defined by more than the use of the overtone series (and intervals drawn from it). Access to computer sonogram analysis made it possible for spectral composers to expand their harmonic material beyond the

³ Bob Gilmore, “The Climate Since Harry Partch,” *Contemporary Music Review* 22/1-2 (March/June 2003): 21.

⁴ Leta Miller and Fredric Lieberman, *Lou Harrison: Composing a World* (New York and Oxford: Oxford University Press, 1998), 103-111.

⁵ Ben Johnston, “American Society of University Composers Keynote Address,” *Perspectives of New Music* 26/1 (Winter 1988): 236.

mathematically ideal overtone series to include the distorted and inharmonic spectra of many real world sounds. The Partch scholar Bob Gilmore has suggested that the spectralists' main interest is in time and form, not microtonality.⁶

The composer Josh Fineberg has defined the essential spectral idea as the conviction that “music is ultimately sound evolving in time.”⁷ In contrast, Harrison, Johnston and Sims seek to create a new musical language analogous to tonality by bringing the ideas of consonance and dissonance back to musical practice—albeit with a far richer sonic palette expanded by the complex intervals of extended just intonation. While Harrison, Johnston, and Sims use their just intervals in an essentially traditional style (with conventional notions of melody and counterpoint), other Americans—James Tenney, Alvin Lucier, and La Monte Young—have made more radical departures from traditional musical forms in ways which complement spectral innovations.

Like the spectralists, **James Tenney** (1934-2006) was interested in the meeting of art and science. Tenney described his work as being essentially experimental: “My music is sound for the sake of perceptual insight—some kind of perceptual revelation. Somehow it seems to me that's what we are all doing—searching to understand our own perceptual processes.”⁸ Tenney frequently spoke of combining the harmonic techniques of Partch with the open, experimental aesthetic of John Cage (1912-1992).

I would now suggest that the aesthetic revolution wrought by John Cage in 1951 is absolutely essential to any truly progressive evolution of harmony, because without its decisive shift of focus from the thoughts and feelings of the composer—and their communication to a relatively passive audience—to the immediate auditory experience of the listener—which may be said to be occasioned by the work of the composer, but assumes an active, participatory audience—the future of music would remain mired in the past. Before harmony can evolve, the role of music itself must evolve.⁹

Tenney's *Critical Band* (1988) is a good illustration of his compositional aesthetics. “Critical band” is a term from acoustics, which refers to the frequency range within which vibrations stimulate the same part of the basilar membrane in the cochlea of the inner ear. Two pure tones sounding within the critical band create a sensation of beating or roughness.

The piece begins on a unison A, the usual tuning note for ensembles. Only after two minutes are new pitches added—members of the ensemble can play, in free rhythm, either the sustained A or pitches immediately above and below in just ratios: 129/128 (about 13 cents, or hundredths of an equal-temperament semitone) above and 127/128 (about 14 cents below). These intervals are so small that the new notes are heard more as mistuned versions of the held A than as distinct pitches. After another minute and a half, two new pitches appear, in addition to the 129/128 and 127/128: these are 65/64 (27 cents above) and 63/64 (27 cents below). As new pitches are added, the earlier ones gradually drop out—the sonority gradually evolves into a tight chromatic cluster (partials 14 to 18 above a low A fundamental), then (at the end of the seventeen-minute piece) into an overtone series stretching over three octaves. This simple process creates many sparkling aural events that do not appear in the piece's notation—beats of various speeds, overtones shifting in and out of audibility, and drifting combination

⁶ Gilmore, op. cit, 30.

⁷ Joshua Fineberg, *Classical Music, Why Bother?* (New York and London: Routledge, 2006), 112.

⁸ James Tenney, “Interview with Gayle Young,” *Only Paper Today* (June 1978): 16, quoted in Larry Polansky, “The Early Works of James Tenney,” *Soundings* 13 (1984): 194-195.

⁹ James Tenney, CD notes to *Donaueschinger Musiktage, 1996* (München: Col Legno, 1997): 74.

tones.

Listening to *Critical Band* next to a piece of comparable length by Grisey—say, *Partiels* (1975)—clearly illuminates the contrasting aesthetic positions of the two composers. Though both compositions seem to start with a similar pitch conceit—the overtone series of a single pitch—they continue in very different ways. In *Partiels*, the initial harmonic series is constantly reorchestrated and subjected to changing rhythmic treatments. Also, Grisey soon begins to distort the initial overtone series, making the sonority gradually noisier and less consonant.

The constant activity and development of *Partiels* reflect the strong influence on spectralism of post-serial composers such as Stockhausen—even though in some ways spectralism was conceived as a reaction to serialism, both movements grew from the same tradition of form based on dramatic tension. In leaving behind this traditional idea of the musical object, Tenney's debt to Cage is clear. Given an interesting acoustical phenomenon (in this case the overtone series), Tenney is willing to trust the listener's aural exploration of the sound to provide a form for the piece, rather than using the phenomenon as material to generate a more conventionally expressive and dynamic form.

From a spectralist's point of view, Tenney's approach to form might seem eventless and dull; but a proponent of Tenney's formal aesthetic might argue that the constant contrasts and shifts of a work like *Partiels* actually distract from the listener's engagement with the music. The frequent surprises keep the listener on edge, continually jarring him away from the contemplation of one musical object or texture as he is confronted by another.

Tenney: If the audience can just believe it, after they've heard the first twenty seconds of the piece, they can almost determine what's going to happen the whole rest of the time. When they know that's the case, they don't have to sit on the edge of their seats...

Young: Waiting for the big bang.

Tenney: What they can do is begin to really listen to the sounds, get inside them, notice the details, and consider or meditate on the overall shape of the piece, simple as it may be. It's often interesting how within a simple shape there can be relationships that are surprising.¹⁰

The question is whether the listener is to be led through the work by the composer's carefully planned interjections and cues, or whether he is to strike his own path into and around the work, investigating it as if it were a work of plastic art or a natural landscape or object. Rather than constantly using contrasts and surprises to direct the listener's attention, Tenney allows the contemplation and observation of an ongoing musical object or process. The extended sense of time created by works such as *Critical Band* suggests Grisey's idea of "dilated time":

For me, spectral music has a temporal origin. It was necessary at a particular moment in our history to give form to the exploration of an extremely dilated time and to allow the finest degree of control for the transition from one sound to the next.¹¹

Tenney's "exploration of an extremely dilated time" is more radical than Grisey's—and as a result, he insists on a far more exact tuning of his chord tones. Musical pacing and intonation are closely linked—as Terry Riley has said, "Western music is fast because it's not in tune."¹² While most spectral composers are content to approximate partials to the nearest quartertone or eighth tone, Tenney

¹⁰ Tenney, "Interview with Gayle Young," 194.

¹¹ Gérard Grisey, "Did You Say Spectral?" *Contemporary Music Review* 19/3 (2000): 1.

¹² Quoted in Kyle Gann, "Just Intonation Explained." <http://www.kylegann.com/tuning.html>.

specifies his pitches to the nearest cent and also provides the just intonation ratios which relate each pitch to the A fundamental.

Alvin Lucier (b. 1931) shares Tenney's anti-dramatic aesthetic, and like Tenney frequently uses acoustic phenomena as the basis of his compositions. In one of his best-known pieces, *I Am Sitting in a Room* (1969), Lucier directs the performer to record a brief text ("I am sitting in a room, different from the one you are in now..."), which describes the entire process of the piece. The recording is played back into the room and rerecorded, over and over again—as the process is repeated, certain frequency components (partials) of the spoken text are amplified by the room's natural acoustical resonances, while others are cancelled out. Eventually only the resonant pitches of that particular room remain, as haunting melodic whistles: "We discover that each room has its own sets of resonant frequencies in the same way that musical sounds have overtones."¹³

The form of this "score"—verbal instructions describing a process, rather than traditional musical notation—owes much to the influence of Cage, with whom Lucier was well acquainted in the 1960s. The work sets a global process into motion, and Lucier gives up control of the specific details of the piece's unfolding. As in Tenney's works, the predictability of the overall form of the piece frees the listener to delve more deeply into the evolving sound. In more recent works such as *Music for Piano with Slow Sweep Pure Wave Oscillators* (1992), Lucier has combined traditional instruments with sine waves which change slowly in pitch. As the sine waves cross the instrumental sounds, they set off subtle kaleidoscopic patterns of interference and beating.

A discussion of just intonation and American parallels to the spectral movement would be incomplete without mention of **La Monte Young** (b. 1935), who arrived at a technique of just intonation independently from Partch and his followers. Young, like Tenney and Lucier, is interested in long expanses of time—sustained drones have been a major part of his music since his 1958 *Trio for Strings*. Young is perhaps best known as one of the fathers (along with Terry Riley) of minimalism—which like spectralism was a reaction against the complexity and abstraction of serialism, though a reaction that led in a very different direction.

Though he was involved with the Fluxus movement of conceptual artists in the early 1960s, the most enduring influence on Young's music has been his apprenticeship with the Indian musician Pandit Pran Nath. From his immersion in Indian music, Young developed an almost mystical reverence for the higher just intervals. His *The Well-Tuned Piano* is a six-hour partially-improvised piece for solo piano in a tuning based on the integers 3 and 7—this yields simple overtone relations like 7:4 (equivalent to the seventh partial of the fundamental), but also such complex composite relationships as 441/256. *The Melodic Version (1984) of The Second Dream of The High-Tension Line Stepdown Transformer from The Four Dreams of China* is a seventy-seven minute work for eight trumpets based on only four pitches, in the ratios 12:16:17:18; the sound is based on Young's childhood memories of the hum of electrical equipment near his Idaho home. The extraordinary length of these pieces is taken still further in his sine-wave installations, which sustain pure tones in complex just ratios for days at a time.

The direct influence of the French spectralists can now be observed in American composition, especially in the academic world—as one might expect with Tristan Murail teaching at Columbia University, and "second-generation spectralists" Edmund Campion and Joshua Fineberg at Berkeley

¹³ Alvin Lucier, "Careful listening is more important than making sounds happen," in *Reflections: Interviews, Scores, Writing* (Köln: MusikTexte, 1995), 434.

and Harvard. Younger American composers have also absorbed spectral influences through the music of composers such as Kaija Saariaho and Jonathan Harvey.

This European spectralism has had its strongest effect in the more academic, “uptown” circles of American composition, while the American composers I’ve discussed here tend to be associated with “downtown” music: experimentalism, conceptualism, and minimalism. The ideas of the just intonation composers have tended to remain on the periphery of the musical scene, though their ideas have expanded and flourished with a new generation of composers, including Larry Polansky, David Doty, and Kyle Gann. Gann, a student of Ben Johnston, has complained, “Why American just intonation composers remain only misguided visionaries, while the French spectral composers are urgently ushered into the canon, I have trouble figuring out.”¹⁴

Perhaps the encounter of the American experimental tradition and French spectralism will be a fruitful one, as the formal complexity and technological sophistication of spectralism come in contact with the pure tunings of Partch and other just intonation composers and the intense focus and conceptual elegance found in the works of Tenney, Young, and Lucier. The ongoing and direct appeal of sound itself as a source of musical inspiration offers the possibility of common ground, even across a wide aesthetic and philosophical divide.

¹⁴ Kyle Gann, “New Music in Old Europe,” *PostClassic* March 24, 2004.
http://www.artsjournal.com/postclassic/2004/03/new_music_in_old_europe.html