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The Spiritual Construction of Tuning in American Experimental Music

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In the West, Pythagoras divided the octave into intervals to stave off chaos.

Birds Don't Know the Names of Notes
—MK Ultra

Prologue

In his *Musica Practica*, the fifteenth-century Spanish scholar Bartolomeo Ramis de Pareia sets forth an account of simple-ratio tuning, based fundamentally on the teachings of Boethius, that purports to work miracles. Ramis announces that his text will reveal ancient secrets of harmony; with the aid of this long-lost wisdom, Ramis promises, "mouse and elephant can swim together, Daedalus and Icarus can fly together."¹ His oratory worthy of a carnival pitchman, Ramis decries "the half-taught singers of [his] time," lamenting that if Pythagoras, Aristoxenus, and Ptolemy had found themselves in Ramis' era, "they would deny that the music of Ramis' time was created by them, so unsuitable, inelegant, and disconnected it has been rendered by the perversity of certain singers."² The principles of tuning Ramis imparts in *Musica Practica* are guaranteed to set straight the wayward path of contemporary music by restoring the practices of an earlier, more pure age. Ironically, Ramis' lasting contribution is not his putative resurrection of the great musical minds of antiquity but rather his amendment to the method of one such mind: almost five hundred years after its completion in 1482, Harry Partch (1901-1974) credits Ramis with remedying one of the major faults in Pythagoras' venerable 3-limit tuning by replacing certain 3/2-derived compounded intervals with other small-number just intervals.³

Like *Musica Practica*, Partch's *Genesis of a Music* claims to reach backward and restore the true way. Partch presents a new scalar resource possessing great flexibility and supposed intelligibility, based on the acoustic models of the past, as an antidote to the homogenizing artifice of equal temperament. Like Ramis, his impact would be projected into the future through a narrow stream of activity—theoretical in Ramis' case and creative in Partch's—rather than radiated throughout the mainstream of musical production. And both texts make an appeal to the infinite: In his Epilogue, Ramis asks the reader to "give thanks to God" for the "beautiful truth" of harmony for which Ramis is a conduit;⁴ Partch, meanwhile, suggests that the pursuit of just intonation may be the key to "a universality which is ultimately attainable without reducing the entire world to the

¹ "Hic mus et elephas pariter natere, Daedalus et Icarus pariter volare possunt." Bartolomeo Ramis de Pareia, *Musica Practica* (Neuhausen-Stuttgart: Hänssler-Verlag, 1993), p. 42.

² Ibid., pp. 42-3.

³ Harry Partch, *Genesis of a Music: An Account of a Creative Work, Its Roots and Its Fulfillments* (New York: Da Capo Press, 1974), p. 375.

⁴ Ramis, *Musica Practica*, p. 170.

minus centigrade of the average swing band," an "enchanted land" of "perception beyond knowledge."⁵ Few informed listeners would dispute Ramis' claim that just intonation is "beautiful"; just intervals produce an extraordinary aural sensation, bringing a vividness and intensity to the consonance-dissonance continuum that tempered intervals can only approximate.

More urgently at stake however, is Ramis' assertion (and Partch's, and many others') that just intonation is "true"—and that such truth is not only empirically demonstrable but, indeed, spiritually elevated. As much through the example of Partch's ardent commitment to his cause as through the book's concrete information, *Genesis of a Music* inspired a small but devoted community of American experimentalists to work with just intonation; almost without exception, these composers have cast their harmonic tendencies as efforts to approach a higher plane. The musicians who have construed just intonation as a means of spiritual discovery and transcendence have, to bolster this contention, marshaled various mythologies and religious traditions whose imprint is apparent not only in their verbal rhetoric, but also in the musical substance of their works. Through textual analysis, discourse study, and biographical research, the goal of this study will be to establish the means by which the "emancipated consonance"⁶ of just intonation acquired the mantle of spiritual rectitude in the experimental community.

Chronology

The construction of consonance rather than dissonance as a path to transcendence coincided, broadly speaking, with the dissemination of essential technical information about just intonation throughout the American new music scene. Establishing a chronology of this dissemination is vital to understanding the fifty-year unraveling of the discourse that gave spiritual privilege to dissonance. Hermann Helmholtz's *On the Sensations of Tone*, the foundational acoustics text of the modern era, is at the beginning of this timeline. Harry Partch discovered it in the Sacramento Public Library in 1923⁷ and immediately recognized it as a solution to the aporiae that had frustrated his earlier studies in music. Although Partch arrived at his 43-tone "monophonic" scale no earlier than late 1933, his exposure to *On the Sensations of Tone*—particularly Helmholtz's descriptions of the tuning theories of Pythagoras and Ptolemy—set in motion an otherwise inconceivable process of experimentation and refinement. Partch's drafts for a volume called *Exposition of Monophony*, the first of which dates from 1928, indicate that he considered and rejected a variety of 11-limit scales before discovering the combination he would advocate in 1949's *Genesis of a Music*.⁸

In addition to Helmholtz, *Genesis of a Music* owes heavily to Henry Cowell's *New Musical Resources*. Gilmore reports that Partch read *New Musical Resources* "shortly after its publication in 1930."⁹ The concept of "utonality," derived from Cowell's study of "undertones," refers to the intervals formed by the inversion of "tonality" (a harmony consisting of odd-numbered partials of the overtone series). Partch declares in

⁵ Partch, *Genesis of a Music*, p. 62.

⁶ Ben Johnston, personal interview, November 25, 2007.

⁷ Bob Gilmore, *Harry Partch* (New Haven: Yale University Press, 1998), p. 48.

⁸ *Ibid.*, p. 65.

⁹ *Ibid.*, p. 56.

Genesis of a Music that utonality, which approximates the sonority of the tempered minor chord, is "the immutable faculty of ratios, which in turn represent an immutable faculty of the human ear."¹⁰ This assertion is spurious: although the undertone series is indeed the sonic working-out of simple ratios, it is not, like the overtone series, implicit in sound. Partch's insistence on the "immutability" of undertone perception is crucial to the maintenance of his musical ideology. Charles Seeger (1886-1979), the eminent composer and musicologist, as well as Cowell's first compositional mentor, espoused this "immutability" for similar reasons, offering greater justification from the literature of Western music than Partch, but no more empirical evidence.¹¹

Cowell (1897-1965) contributed to the discursive reprioritization of consonance over dissonance through his *New Musical Resources* and his central social position in the network of American experimentalists, rather than through his own music. Cowell received his earliest formal training in music from Seeger between 1913 and 1917. Seeger seems to have been somewhat exasperated by Cowell, who had no interest in cultivating a unique compositional voice but preferred instead to explore a musical "tabula rasa, in which there are infinite possibilities of combination—so why not try them?"¹² Certainly the rigor with which Seeger would later codify his principles of "dissonant counterpoint" must have chafed at Cowell's freewheelingly experimental outlook, perhaps motivating the former's suggestion that Cowell codify his own musical thinking in what was to become *New Musical Resources*. However, Seeger's investment in the spiritual dimension of harmony was significant: he labored to come to terms with a reconciliation of thought and feeling in aesthetic production and appreciation, studying the writings of John Dewey, Henri Bergson, Bertrand Russell, and Benedictus de Spinoza. These efforts culminated in the 1925 publication of "Prolegomena in Musicology: the Problem of the Musical Point of View and the Bias of Linguistic Presentation" in *Eolus*. Two years earlier, Seeger had been involved in a heated debate with Dane Rudhyar (1895-1985) over the music of Carl Ruggles, whose adoption of strictly systematic compositional methods was dismissed by Rudhyar and lauded by Seeger.¹³ Later in the 1920s, Cowell and Rudhyar would become quite close, drawn together not only by their shared interest in new music but also by their shared involvement with Theosophy.

An account of the prewar musical-spiritual climate would be incomplete without mention of Arnold Schoenberg (1874-1951). The repercussions of Schoenberg's presence in Los Angeles continue to ripple through the American new music situation in many ways, but his technical innovations have been discussed and promulgated in American discourse to the near-exclusion of his mystical preoccupations—beyond, of course, his infamous superstition. John Covach proposes, on the basis of the composer's conflation of "vision" (i.e., to another plane) with musical "idea," that Schoenberg's aesthetic theology, a term borrowed from Carl Dahlhaus, "is more like Theosophy."¹⁴ Although Schoenberg may not have articulated it in quite this fashion, dissonance acquired a de

¹⁰ Partch, *Genesis of a Music*, p. 89.

¹¹ Taylor Aitken Greer, *A Question of Balance: Charles Seeger's Philosophy of Music* (Berkeley: University of California Press, 1998), p. 148.

¹² Charles Seeger, "Henry Cowell," *Magazine of Art* 33 (May 1940), p. 323.

¹³ Greer, *A Question of Balance*, p. 109.

¹⁴ John Covach, "Schoenberg's 'Aesthetic Theology,'" *19th Century Music* 19 (Spring 1996), p. 256.

facto spiritual privilege for him insofar as it represented the inevitable extension of the principles—the "inextinguishable energy [again, Dahlhaus' term] that connects across the ages"—set out in the sacred texts of the European art-music canon.¹⁵ Schoenberg's students in Los Angeles included Lou Harrison (1917-2003), who wrestled with this essentialism in his own music for decades.

Schoenberg also combined a keen intellectual interest in expanding musical possibilities with a characteristically Austro-German dialectical conception of the future of harmony. He corresponded in the early 1930s with Joseph Yasser (1893-1981), musicologist and co-founder, with Seeger and others, of the American Musicological Society, whose theory of "supra-diatonic" harmony purported to be an organic (and therefore inevitable) next step for modern music. This system compresses a long chain of 3/2 fifths from F to A## into a tempered 19-tone scale with twelve "regular degrees" and seven "auxiliary degrees" analogous to the naturals and accidentals of the tempered gamut.¹⁶ A diagram in Yasser's article "The Future of Tonality" laying out the dialectical relationship among tonality (labeled "thesis"), atonality ("antithesis"), and supra-tonality ("synthesis") makes his monumental aspirations for this new theory quite clear.¹⁷ In his 1934 letter to Schoenberg, Yasser very eagerly points out to the composer a number of indications in Schoenberg's music that the latter may already be dimly aware of the considerations that led Yasser to his prescriptive theory; however, Schoenberg's response is (understandably) noncommittal, maintaining that "a musical ear must have assimilated the [twelve-tone] tempered scale" so vital to his own dodecaphony and moreover that "a singer who produces natural [i.e., just] pitches is unmusical, just as one choosing to act on the street in a 'natural' way would be considered indecent."¹⁸ It goes without saying that Schoenberg was unconvinced by Yasser's sales pitch; nevertheless, his research seems to have piqued Schoenberg's curiosity, and the composer's tone in his response to Yasser is generally encouraging.

Although Rudhyar and Seeger disagreed strenuously about the degree to which the rational mind should control the compositional process, both took the spirituality of dissonance very seriously; Cowell's interest, on the other hand, lay largely in the realm of the scientific. His approach to just intonation seems to spring purely from an insatiable intellectual curiosity unencumbered by commitment to an "emotional coefficient."¹⁹ Cowell begins his chapter on "Tone Combinations" by proclaiming his intent to explicate "certain scientific and historical aspects of music."²⁰ In the foreword, he stresses that "it is not the aim of this work to delve into questions of aesthetics, into any philosophical discussion of what is good or bad, what should or should not be done, or what may or may not be done."²¹ The passages in *New Musical Resources* regarding frequency ratios that Harry Partch read in 1930 are rooted in the work of a number of theorists including Helmholtz and Riemann, whose treatment of dualism influenced not only Partch and

¹⁵ Ibid., p. 255.

¹⁶ Joseph Yasser, *A Theory of Evolving Tonality* (New York: American Library of Musicology, 1932), pp. 307-10.

¹⁷ Ibid., p. 329.

¹⁸ Joseph Yasser and Arnold Schoenberg, "A Letter from Arnold Schoenberg," *Journal of the American Musicological Society* 6 (Spring 1953), pp. 53-62.

¹⁹ Seeger, "Henry Cowell," p. 324.

²⁰ Henry Cowell, *New Musical Resources* (New York: Cambridge University Press, 1930), p. 3.

²¹ Ibid., p. xv.

Cowell but also, in his later *Tradition and Experiment in the New Music*, Seeger.²² None of this, however, is to imply that Cowell's concept of music and musical innovation was without spiritual dimension.

To understand how Cowell's artistic cosmology reconciled the intellectually and the spiritually speculative in music, it may be helpful to examine briefly the remarkable interpenetration of science and mysticism in the air at the Theosophical community in Halcyon, California, where Cowell spent much time. Describing this unique environment, Michael Hicks identifies a confluence of "Asian religions, pagan philosophy, and Western science."²³ Cowell made his affiliation with Halcyon official following his mother's death in 1916. Seeger's admonitions to investigate new techniques of music-making in a thorough and systematic manner must have seemed broadly consonant with the heavy emphasis Theosophists placed on the uplifting potential of scientific progress. However, the strain of "pagan philosophy" mentioned by Hicks should not be overlooked. Cowell received much encouragement at Halcyon from John Varian, an Irish-American poet whose passion for Celtic mysticism stirred the budding composer to write such early pieces as *The Tides of Manaunaun*. Looking a bit further back in Cowell's aesthetic and philosophical formation, Varian's fascination with Irish lore was shared and prefigured by Harry Cowell, Henry's father, himself an Irish immigrant. Harry's own poetry evidences a strong attachment to religious imagery paired with a sharp skepticism of dogma and organized religious observance.²⁴ Hicks notes that Cowell's parents raised their son on a *mélange* of "leftist politics, mysticism, scientific experimentation, and multiculturalism";²⁵ for the young Cowell, the coexistence of science and spirituality was not paradoxical—a notion privileged by Theosophy, which in turn provided a framework for Seeger and his circle to articulate and expand upon it.

Although his widow Sidney denied that he had any but the most flirtatious relationship with the Temple of the People at Halcyon,²⁶ it is not at all unreasonable to suspect (Sidney's vigilant policing of her late husband's legacy aside) that Cowell was at the very least sympathetic to Theosophy's tenets. Among his colleagues, certainly, such beliefs would not have seemed especially outrageous; Rudhyar and Ruth Crawford, Seeger's student and future wife, subscribed openly and wholeheartedly to those principles.²⁷ Nonetheless, *New Musical Resources* strives not to be a product of ideology or mysticism but rather a clearinghouse of contemporary techniques with credible (if occasionally, in retrospect, mistaken) scientific foundations.

As in so many areas of Cowell's work, he sought to share, facilitate, and forge connections; his tireless efforts to bring together musicians whose work interested him led Lou Harrison to dub Cowell a "central information booth" for emerging American composers.²⁸ Harrison met Cowell in 1935, having already digested *New Musical Resources*; Cowell's techniques were made manifest in "nearly every aspect of Harrison's

²² Greer, *A Question of Balance*, p. 144.

²³ Michael Hicks, *Henry Cowell, Bohemian* (Urbana: University of Illinois Press, 2002), p. 82.

²⁴ *Ibid.*, p. 12.

²⁵ *Ibid.*, p. 3.

²⁶ Steven Johnson, "Henry Cowell, John Varian, and Halcyon," *American Music* 11 (Spring 1993), p. 2.

²⁷ *Ibid.*, p. 1.

²⁸ Lou Harrison, "Asian Music and the United States," *Third Asian Composers' League Conference/Festival Final Report* (Manila: National Music Council of the Philippines, 1976), p. 87.

work,"²⁹ from rhythmic subdivision to polytonalism. However, it was not until he read Partch's *Genesis of a Music* in 1949 that the creative possibilities of just intonation presented themselves to Harrison; even a concert of Partch's music in 1944 left him cold.³⁰ At thirty-two years of age, Harrison experienced a sudden conversion from his previous devotion to dissonance in the traditions of Ives and Schoenberg during a period of hospitalization in New York after a nervous breakdown.³¹

Unlike the older Harrison, who had the benefit of both *New Musical Resources* and *Genesis of a Music*, Ben Johnston's understanding of just intonation's potential came, almost unmediated, from Partch. Johnston (b. 1926) read *Genesis of a Music* during his graduate study at the Cincinnati Conservatory of Music in 1950, then traveled to Gualala, California to work with Partch directly for six months. Although much of Johnston's time in Gualala was spent doing housework, he was able to ingratiate himself firmly enough into Partch's confidences that the latter agreed to conduct a number of performances, beginning in 1957, at the University of Illinois at Urbana-Champaign, Johnston's future employer.³² At that point, Partch's influence began to spread more widely, due in part to the performances of his "spectacle" pieces that were mounted in Urbana and in part to his availability to a new generation of students, of whom James Tenney (1934-2006) was a prime example. However, the next major development in creative experimentation with pure ratio tuning would take place not in Urbana, Illinois but in New York, under the auspices of La Monte Young (b. 1935).

In May 1962, violinist Tony Conrad began to collaborate with Young, whose exploration of harmonic stasis had begun some years earlier.³³ Young attributes his initial interest in just intonation to Conrad, who had learned the principles of simple tuning ratios from his violin teacher in high school.³⁴ Young and Conrad started to work extensively with just intonation following a discussion about the pursuit of new intervallic possibilities:

At a point about a month or two into my participation in the group there was (much) discussion concerning the possibility that my drone violin might introduce a third tone. I had already begun with the tonic or *Sa* and had then introduced the fifth or *Pa*. I was interested in the major third, whose droning sound I had of course learned to love from bluegrass and baroque music, but La Monte (having trained in the Western art tradition [i.e., the "tradition" of atonal music], and as well having participated in the West Coast jazz scene) had adopted an animus against thirds, so the major third was dropped. The major second received some attention, but then La Monte mentioned a lowered seventh degree that he had heard and liked in some blues. I was excited to imagine that he might be thinking of the seventh harmonic. When I mentioned this possibility, though, I realized that I was the only one in the group who had been exposed to an understanding of simple

²⁹ Leta E. Miller and Fredric Lieberman, *Lou Harrison: Composing a World* (New York: Oxford University Press, 1998), p. 11.

³⁰ *Ibid.*, pp. 44-5.

³¹ *Ibid.*, p. 37.

³² Introduction by Bob Gilmore to Ben Johnston, *Maximum Clarity and Other Writings on Music*, ed. Bob Gilmore (Urbana: University of Illinois Press, 2006), pp. xxv-xxix.

³³ Keith Potter, *Four Musical Minimalists* (Cambridge: Cambridge University Press, 2000), p. 60.

³⁴ It should be noted that Conrad maintains a deep suspicion of connections between just intonation and both spirituality and mathematics ("at least since Descartes' time"); only after I made clear that my sympathies do not lie with ideological claims that privilege just intonation on the basis of mysticism did Conrad agree to provide the information about Young that I requested.

harmonic relationships as the basis of the musical scale. There was nothing privileged about this information, and since it had a bearing on what I was about to do in introducing the seventh harmonic as a resonant just-intoned interval, I was happy to be able to explain the foundation of this interval's sound in rational frequency ratios. At first this invocation of seemingly arcane arithmetical terms went down with difficulty. However, La Monte quickly realized the richness and utility of this alternative characterization of musical pitch relationships, and before too very long we began an endless train of constructive conversations almost completely centered on arithmetical whole number ratios.³⁵

Several details in Conrad's account deserve additional reflection. Young's group seems to have given serious and deliberate consideration to the potential "third tone" Conrad might provide: rather than disturb the purity of the group's work by simply trying out a number of possible third tones in performance, Conrad implies that Young had to be convinced to commit to the seventh harmonic before experimenting with it in musical practice. Although Young may have been initially skeptical of such "arcane arithmetic[s]," the conceptual *Einfachheit* of just intonation surely had some persuasive effect.

Moreover, the very idea that Conrad's proposal of "arithmetical whole number ratios" as a model for imagining harmony unlocked a host of creative possibilities for Young's group allows the evolution of his work to be presented as a rediscovery of ancient methodology; having ingested and rejected both "the Western art tradition" and "the West Coast jazz scene," Young (and his collaborators) conceived of a harmonic strategy whose implementation constituted an entirely new approach. Young's own rhetoric regarding just intonation reinforces the "rediscovery" quality of his narrative even though he must at some point have come into contact with the music and writings of Partch and Cowell, who had long since made clear their findings about just intonation in the context of experimental music. It was slightly later, in the early 1970s, when Young's colleague Terry Riley began to adjust his battery of electronic keyboards to produce just intervals; however, unlike Young's, Riley's music is not structurally dependent on just intonation. It represents for Riley a layer of sonic varnish, so to speak, that elevates his music's affective capability, rather than a bedrock compositional determinant.³⁶

Taxonomy

Although the composers discussed above have embraced a wide variety of attitudes toward the transcendent potential of harmony, they group rather clearly into two categories: composers whose mature work is largely consonant-sounding and is accompanied by rhetoric that privileges consonance on spiritual grounds and those whose mature work is largely dissonant-sounding and may also be accompanied by rhetoric that privileges dissonance on spiritual grounds. Not coincidentally, the "consonant"³⁷

³⁵ Tony Conrad, personal email, November 17, 2007.

³⁶ Potter, *Four Musical Minimalists*, pp. 138-9.

³⁷ The labels "consonant" and "dissonant" are presented in quotation marks to remind the reader that none of the cited composers produced only consonant or dissonant music; even a cursory look at Young's *Trio for Strings* or Cowell's *Aeolian Harp* would quickly dispel such a notion. The "consonant/dissonant" dichotomy as I invoke it here is a reflection on these composers' ideological perspectives on consonance and dissonance, rather than on their music.

composers (Partch, Johnston, and Young) made just intonation, in some manner or other, a central part of their music, whereas the "dissonant" composers (Seeger, Rudhyar, and Cowell—known, along with several others, as the "ultra-moderns") were concerned mainly with the general ramifications of whole-number ratios throughout musical praxis.

Lou Harrison, whose music confounds this classification somewhat, came relatively late in life to just intonation, and accordingly his music made room for consonance after his epiphany. In Harrison's music written after 1952, Miller and Lieberman contend, he "reserved serialism (often in conjunction with Equal Temperament) for representations of the evils of Western society," offering *Pacifika Rondo's* serialized "historical musical symbols of tragedy" as evidence.³⁸ Prior to his encounter with *Genesis of a Music*, his subscription to the ratio-based technique elucidated in *New Musical Resources* places him firmly alongside Cowell, Rudhyar, and Seeger, although his compositional technique admitted a broad plurality of means throughout his career. Afterwards, he mapped the apprehensible sonic distinction between tempered intervals and pure ones (whether manifest in 5-limit diatonicism or a newly synthesized gamelan scale) to the affective compass of his music's topoi.

Terry Riley's music is a problematic case as well: almost all of it is consonant-sounding, but not all of it is tuned in just intervals. When Riley performs his own music, which he often does, he has the freedom to insist on pure ratios when it suits him by simply configuring his keyboards accordingly. Moreover, his written music rarely moves outside of one or two scalar areas, such that the complicated modulatory maneuvering that is required in Ben Johnston's music, for instance, is unnecessary.³⁹ Riley's situation with respect to the integration of just intonation is uniquely flexible; consequently, he has never had to invest himself fully in just intonation as an aesthetic *sine qua non*.

Although the consonant-dissonant typology is reductive and gainsaid by at least two major composers, it suggests a number of potentially informative generalizations. The cohort of "consonant" composers has a mean birth year of 1921; our three "dissonant" composers, on the other hand, have a mean birth year of 1893. Based on these figures, it may be tempting to judge that there is a generational gap, so to speak, between those composers who elevated consonance and those for whom dissonance was a *cause célèbre*; however, closer examination reveals that Partch (1901) was born a full twenty-five years before Johnston (1926), who was born nine years before Young (1935). Compare this distribution to that of the dissonant composers, who were born within eleven years of one another, with Cowell (1897) and Rudhyar (1895) only two years apart—Seeger (1886) is the outlier. Such a distended spread is, in part, a testament to the singularity of Harry Partch, whose work went unknown for all of his youth and much of his adulthood. Perhaps it also reflects the resistance of the American new music community at large—a community still in thrall to Western Europe—to what it must have perceived as a regression, a retreat from the dialectical, Schoenbergian folding-in of greater and greater degrees of dissonance. In his *Modern Music* review of Partch's 1944 performance of *U.S. Highball*, Lou Harrison laments Partch's failure to make "really. . . integral use of the forty-three tones" in the piece's harmonic structure;⁴⁰ Miller and Lieberman propose that Schoenberg's influence on Harrison was so great that the latter

³⁸ Miller and Lieberman, *Lou Harrison*, p. 217.

³⁹ Potter, *Four Musical Minimalists*, pp. 138-9.

⁴⁰ Lou Harrison, "On the Choros of Villa Lobos," *Modern Music* 22 (Jan.-Feb. 1945), p. 85-86.

might have perceived Partch's tuning scheme as a waste of serial possibilities,⁴¹ an interpretation that would surely have been well-represented if not widespread among the American musical literati. Partch, meanwhile, maintained that "what was called progress was not necessarily progress to him, however sincerely it might be accepted as such by many, perhaps even a great majority."⁴² The regressive tint of just-tuned consonance is only half the story, however; the practical difficulties of preparing and performing music in just intonation are substantial. Because there is not yet a mainstream just-intonation performance practice, a composer who specifies the intonation of his music as carefully as have Partch, Johnston, and Young necessarily demands rehearsal time in quantities that new music has seldom been afforded since the end of the common practice period. The combination of just intonation's extraordinary technical requirements and its apparent retreat from critically sanctioned dissonance were sufficient to marginalize it within an already marginalized avant-garde practice. Furthermore, there already existed a microtonal practice that seemed to advance the modernist "project"⁴³ by fragmenting chromatic pitch-space without challenging the framework of 12-tone equal temperament.

The 50-cent quarter-tone, like all intervals, can be approximated with just tuning ratios—11/8 and the 33/32 undecimal (11-limit) comma, which produce intervals of 55.1 ("perceptually indistinguishable" from a quarter-tone-sharp perfect fourth⁴⁴) and 53.3 cents, respectively—but even if it is taken to be identical with an undecimal comma, Partch notes, its expansion to 24-tone equal temperament produces audible "roughness" in most simultaneities and is therefore an unacceptable compromise.⁴⁵ It is an unsatisfactory substitute for what Riley calls the "gorgeous contours. . . dependent on these unequally shaped intervals."⁴⁶ Charles Ives (1874-1954) made celebrated use of equal-tempered quarter-tones in several pieces; these works, as well as the experiments of Alois Hába (to which Cowell devotes space in *New Musical Resources*), would have been well-known to the ultra-moderns. Quarter-tones had been in Ives' ears since childhood, when his father constructed elaborate devices to play them using violin strings; reportedly, this contraption was a form of punishment in the Ives household.⁴⁷ The elder Ives' interest in quarter-tones seems, like Cowell's in simple harmonic ratios, to stem from an impulse to experiment, a drive to apply rational principles in order to learn more about the nature of musical sound. In *Silencing the Sounded Self*, Christopher Shultis makes the case that Ives' music represents a sort of objective transcendentalism in the tradition of Ralph Waldo Emerson; Shultis contrasts Ives with John Cage, whose unverifiable experimentalism is prefigured by Henry David Thoreau.⁴⁸

⁴¹ Miller and Lieberman, *Lou Harrison*, p. 44.

⁴² Partch, p. 6.

⁴³ Following the definition of "project" elucidated in Frank Cox' "Musical Progress? New Music and Perils of Progressivist Historicism," *The Foundations of Contemporary Composing*, Claus-Steffen Mahnkopf, ed. (Hofheim: Wolke Verlag, 2004), pp. 11-34.

⁴⁴ Gilmore, personal email, December 27, 2007.

⁴⁵ Partch, *Genesis of a Music*, p. 428.

⁴⁶ Potter, *Four Musical Minimalists*, p. 139.

⁴⁷ Stuart Feder, *The Life of Charles Ives* (New York: Cambridge University Press, 1999), p. 18.

⁴⁸ Christopher Shultis, *Silencing the Sounded Self: John Cage and the American Experimental Tradition* (Boston: Northeastern University Press, 1998), p. 5.

Harry Partch

If analogies can be drawn between Ives and Emerson and Cage and Thoreau, perhaps Harry Partch and Walt Whitman are similarly parallel. For Partch, just intonation is a crucial component of the wider project described in *Genesis of a Music*: "corporeality," the antithesis of musical "abstraction" and the ideal whose disappearance from the world of concert music Partch mourns.⁴⁹ According to Johnston, "[c]orporealism was a theory that Partch lived."⁵⁰ Partch railed against the severing of music from the physicality of performance and the clarity of the spoken word. Performing Partch's music requires the engagement of not only the body (often, given the design of his instruments, in three dimensions) but also the ear (which is responsible for verifying the tunable intervals in real time) and the voice (whose use is sometimes asked of instrumentalists in a "Greek chorus"-like capacity) in addition to the aesthetic and self-reflective sensibilities demanded by most music. Of course, for Partch, the process of making music could begin in the carpentry workshop rather than in the studio; because he built and modified his instruments by hand, his music was predicated on a physical connection to its means of production.

With respect to Emerson, Thoreau, and Whitman, Larry J. Reynolds and Tibbie E. Lynch propose that for each of these three transcendental authors, "one of the five senses initiates the transcendental experience: for Emerson, sight; Thoreau, hearing; and Whitman, touch."⁵¹ They assert also that "Whitman shared neither Emerson and Thoreau's appreciation for the distant and abstract sensation nor their subordination of the physical to the spiritual."⁵² In an exhortation to which Partch would surely have been sympathetic, Whitman himself writes that

[m]ost writers have disclaimed the physical world and they have not over-estimated the other, or soul, *but have under-estimated the corporeal*. How shall my eye separate the beauty of the blossoming buckwheat field from the stalks and heads of tangible matter? How shall I know what the life is except as I see it in the flesh? I will not praise one without the other or any more than the other.⁵³ [emphasis mine]

Whitman's feelings reflect his Quaker origins, particularly the principle of the "Inner Light"—"the spirit of God in each man."⁵⁴ However, although Whitman's mother was of Quaker stock, and Quaker meetings were common on Long Island at the time of his childhood, neither he nor his parents family were practicing Quakers. As he matured and confronted the contradictions and problems of the Quaker doctrine that had been in his peripheral vision as a youth, Whitman cultivated a strong spirituality while continuing

⁴⁹ Partch, *Genesis of a Music*, p. 42.

⁵⁰ Ben Johnston, "The Corporealism of Harry Partch," in *Maximum Clarity and Other Writings on Music*, p. 219.

⁵¹ Larry J. Reynolds and Tibbie E. Lynch, "Sense and Transcendence in Emerson, Thoreau, and Whitman," *The South Central Bulletin* 39 (Winter 1979), p. 148.

⁵² *Ibid.*, p. 150.

⁵³ Walt Whitman quoted in F. O. Matthiessen, *American Renaissance: Art and Expression in the Age of Emerson and Whitman* (New York: Oxford University Press, 1941), p. 525.

⁵⁴ Lawrence Templin, "The Quaker Influence on Walt Whitman," *American Literature* 42 (May 1970), p. 173.

to value Quakerism's rejection of the "mummery of prayers and rituals and the rant of exhorters and priests."⁵⁵ His spiritual individualism grew, in large part, from a lengthy process of critical evaluation that mitigated the totalizing, ascetic Quaker philosophy whose proscription of books, music, and theatre would have been impossible for Whitman to obey.⁵⁶

Similarly, Partch was raised by parents who were, to differing degrees, disillusioned with Presbyterian dogma. Partch's father Virgil abandoned the church after several experiences, both in China and in America, that demonstrated the irreconcilability of Presbyterian doctrine with his own moral instincts. Speaking about her own childhood in China, Pearl S. Buck—whose parents were Presbyterian missionaries as well—stated that she no longer had the need for "any other faith than her faith in human beings"⁵⁷; Virgil's rejection of Presbyterianism may have arisen from the same sentiment. Jennie, Partch's mother, continued to identify herself as a Christian, specifically a Christian Scientist—an affiliation that had significant consequences for Partch when he contracted the mumps as a young boy. Because Jennie's beliefs prevented her from seeking a legitimate physician's attention for her son, Harry's mumps went untreated and may have caused the atrophy of his testicles, sterilizing him for life. Gilmore also raises the possibility that Partch suffered from undescended testes; in either case, whatever the capabilities of contemporary medical science to deal with these problems, Jennie would have declined to consult it.⁵⁸ It is hardly surprising that Partch developed a mistrust of religious dogma. Interestingly, in his essay "Show Horses in the Concert Ring," Partch characterizes the gatekeepers of university music in ecclesiastical terms, attacking the "high priests of the musical academy."⁵⁹ In 1947, the time of its writing, Partch was in residence at the University of Wisconsin in Madison. *Genesis of a Music*, whose final draft Partch began at this time, often echoes the frustration with academic conservatism and its creative stagnation voiced in "Show Horses." Partch's rejection of orthodoxy in the guise of musical abstraction in favor of corporeality is particularly evident in *Barstow*, a setting of hobo inscriptions from a highway guard-rail in Barstow, California. His treatment of inscription no. 6, "Jesus was God in the flesh," is an instructive example.⁶⁰

Partch invites the singer to take a "two-voiced" approach; the half-tempo lines, written against a less violent accompanimental texture, can be sung comfortably in a traditional, church-like manner, but the faster lines lend themselves to a harsh and disjointed delivery—especially the "hey-hey-hey's," aspirated onsets which require the singer to engage his abdominal muscles. Because Partch interpolated the "hey's," which are not found in the original inscription, it is reasonable to suppose that he placed this physical hurdle quite deliberately: the "hey's" interrupt the line, reinforcing its distinction from the slower, more traditional, European singing, in a quintessentially corporeal way.

Charles Ives' "General William Booth Enters Into Heaven," with its alternating

⁵⁵ Walt Whitman quoted in Clifton Furness, *Walt Whitman's Politics* (New York: American Mercury, 1929), p. 40.

⁵⁶ Templin, "The Quaker Influence on Walt Whitman," p. 167.

⁵⁷ Pearl S. Buck, "This I Believe," radio broadcast, 1951. [ST: More info. for Radio transcript. Station/date]

⁵⁸ Gilmore, *Harry Partch*, pp. 21-4.

⁵⁹ Harry Partch, "Show Horses in the Concert Ring," quoted in Gilmore, *Harry Partch*, p. 45.

⁶⁰ Harry Partch, *Barstow: Eight Hitchhiker Inscriptions from a Highway Railing at Barstow, California* [1968 Version], Richard Kassel, ed. (Madison: A-R Editions, 2000), p. 23.

strident and sweet passages (on the words "Are you washed in the blood of the lamb?"), shares such a two-tiered vocal rhetoric. Rather than couple changes in the manner of elocution to changes in the text, however, Partch sets the exact same words in two quite different ways, symbolizing perhaps the double nature—the welcoming face and the brutish spirit—of organized Christianity. Kassel interprets the more boisterous mode of text-setting as an allusion to Native American song, which he then contrasts with the "restrictive" tradition of Christian music;⁶¹ Partch's early exposure to Yaqui music in the Southwest may support this contention, but the kind of Native American music he seems most clearly to be invoking is in fact the peyote song, itself a sort of Christian music. Peyote songs, improvised according to strict conventions, accompany peyote rituals carried out over several days' time; such rituals were practiced by crypto-Christian peyote cults whose members ingested hallucinogens and described their visions. Whether Partch knew peyote songs firsthand is uncertain, but their strong-weak duple stress patterns, small intervallic compass, and repetitive, syllabic texts are equally characteristic of Partch's sixth inscription.⁶²

Borrowing from non-Western traditions as an antidote to Western modernity is a well-trodden trope throughout the twentieth century in American music. Partch's *Seventeen Lyrics by Li Po*, his earliest acknowledged work, is on one level a piece of relatively uncritical exoticism; by the composition of *Barstow* almost ten years later, Partch had developed the means—not necessarily technical means, such as the adapted viola and scalar resources that were already in place in 1933 upon the earlier work's completion, but greater creative facility and judgment—to draw on his knowledge of non-Western music in a manner that produced multiple layers of associations, while continuing to further his project of corporealism.

Partch's harmonic decisions in *Barstow*'s sixth inscription fortify the two-headed nature of his text-setting. The composer capitalizes on the close relationship between the 8/5 otonality, which sounds similar to E-flat major, and the 6/5 utonality, which sounds similar to E-flat minor.⁶³ At m. 130, when the churchlike vocalism first appears in its characteristic half-tempo environment, the ensemble sustains an 8/5 otonality after a passage in 6/5 utonality (Kassel spells the Chromelodeon's crucial third as an F-sharp lowered by septimal and syntonic commas); in m. 132, once the instruments have reentered in the previous tempo, the 6/5 utonality reemerges. This sliding "parallel minor" relationship in which the 6/5 utonality is yoked to the faster, more aggressive music and the 8/5 otonality to the sanctimonious utterance (the vocal line itself outlining a three-limit E-flat major chord, an approximate 8/5 otonality) implies in the two modes of delivery two corresponding faces of the same creature, a pious public mask and a barbaric *vrai visage*. The seamlessness of these transitions from choirboy to savage is facilitated by dissonant passing chords related to the structural harmonies by Partch's principle of "tonality flux" whereby two tonalities with members in close pitch proximity may be modulated between regardless of ratio relationship (a kind of parsimonious microtonal voice-leading).⁶⁴

⁶¹ Richard Kassel's "Introduction" in Harry Partch's *Barstow*, p. lxxv.

⁶² Bruno Nettl, "Observations on Meaningless Peyote Song Texts," *The Journal of American Folklore* 66 (Spring 1953), pp. 161-4.

⁶³ Kassel, "Introduction" in Harry Partch's *Barstow*, p. lxx.

⁶⁴ Partch, *Genesis of a Music*, p. 189.

Significantly, although "Jesus was God in the flesh" is clearly legible as an indictment of Christian hideboundness, it is not counterbalanced by an overtly "transcendental" passage of the sort with which Partch might suggest an alternative spirituality. Instead, the eighth (i.e., final) inscription presents an ambivalent, uncertain response to the sixth. The longest of the inscription settings, the eighth weaves between anger and good humor with startling rapidity. The text, as set by Partch, is as follows (all vocables are Partch's interpolations):

Here's wishing all who read this, if they can get a lift, and the best of luck to you. Why in hell did you come, anyway? Damn it anyhow, here I am stuck in the cold. I've come twenty-seven miles from Chi, Illinois, Slept along the highway, Slept in open boxcar with no top, Went hungry for two days (raining too). Dah dah dah dah, But they say there's a hell [Chorus: What the hell], What the hell do they think this is? [Chorus: Do they think about this?] Dah dah dah [etc.] I'm on my way, One half of desert to the east, Then back to El-lay to try once more. Car just passed by, Make that two more, three more. Do not think they'll let me finish my story. Here she comes, a truck, not a fuck, but a truck. [Chorus: Just a truck.] Hoping to get the hell out, here's my name, Johnnie Reinwald, Nine-Fifteen South Westlake Avenue, Los Angeles. Do-dee-do [etc.] Here's wishing all who read this, if they can get a lift, and the best of luck to you. Dah dah dah [etc.] [Chorus, entire ensemble: Why in hell did you come, anyway?]⁶⁵

Partch uses a spoken "chorus" part (usually just one performer) in addition to the singer to suggest a duality not unlike the sixth variation's: the spoken chorus, worldlier and more corporeal than the trained singer's voice, provides interjections that emphasize the inscriber's frustration, such as "What the hell," and "Do they [the financially solvent] think about this?" Both parts are active in parallel—the speaker speaking, the voice vocalizing wordlessly—during the sentence "I'm on my way, One half of desert to the east, Then back to El-lay to try once more," a sweeping phrase that seems to contain the optimism and pessimism alike of the inscription.

Like the speaker's spirits, Partch's music swings from extreme to extreme in the equivocal eighth inscription. After the initial recited phrases, "I've come twenty-seven miles. . ." is set low in the singer's tessitura to agitated accompaniment, followed by a doleful utonal vocalise. "I'm on my way. . ." is given a broader, almost Menottian treatment; the jauntiness of "Car just passed by. . ." is quickly subverted to panic when the speaker gives his address, then supplanted by cartoonish, drunken caterwauling on "Doh dee doh. . ." "Here's wishing all who read this. . ." is intoned solemnly, but the chorus gets the last word: "Why in hell did you come, anyway?" (Kassel suspects that this line may also be Partch's parting shot at his audience.⁶⁶) Having experienced the vicissitudes of hobo life firsthand, it is unsurprising that Partch chose to end *Barstow* in a manner that is not wholly affirmative. Nevertheless, the eighth inscription's plurality of affects, its expressive heterodoxy, is ultimately congruent with Partch's idea of transcendence: an "enchanted land," a dialectic of emotional conditions that can be perceived but not articulated.

⁶⁵ Partch, *Barstow*, p. xlvi.

⁶⁶ Kassel, "Introduction" in Harry Partch's *Barstow*, p. xlvi.

Ben Johnston

Given the scarcity of Partch's specialized instruments, *Barstow* is most likely to be performed today in its arrangement by Ben Johnston, Partch's only real student of composition, for string quartet and vocalist. The piece was recorded in this form by the Kronos Quartet with Johnston himself as the vocalist (the spoken chorus part was eliminated and some of its interjections reassigned to the singer). When Johnston traveled with his wife Betty to Gualala, California to meet Partch, having read *Genesis of a Music* but not knowing Partch's music, he entered a period of servitude under the older composer not unlike the traditional Hindu *guru-sisya* relationship.⁶⁷ Johnston and his wife were responsible for maintaining Partch's instruments, repairing their guest cottage, gardening, cooking, and various other domestic tasks. They even gathered firewood,⁶⁸ one of the *sisya's* customary duties.⁶⁹ At first, Partch was unwilling to discuss his theoretical work with Johnston, who earned his place in Partch's confidences by learning to play several of the instruments Partch had built. By the time Johnston left Mills College, where he had gone after Gualala, to take a teaching post in Champaign-Urbana, he had positioned himself to be the perfect advocate for Partch and his music, possessing both the credibility of a professorship at the University of Illinois and the irascible Partch's trust.⁷⁰

Johnston, like Partch, had a complex religious formation; as in Partch's case, this complexity owes initially to differences between Johnston's parents. He was raised in the Baptist church by a religious mother, but as he matured, he found the views of his father, an agnostic, increasingly persuasive. In his youth, he worked as a copy assistant for the Richmond Times-Dispatch, where his father was managing editor. When reports of such world events as the German invasion of North Africa came in, Johnston was acutely aware; it was impossible for him to retain a rosy view of the global situation. This process of disillusionment was capped by an especially striking experience during Johnston's time in the U. S. Navy.

Having joined the Navy to pre-empt the draft, enjoy some freedom to choose his area of specialization, and attend the Navy School of Music, Johnston was assigned to the *USS Augusta*, the CINCLANT (Commander in Chief, Atlantic Command) flagship. He played trombone in the United States Navy Band, performing for the important occasions on board; high-profile guests included Presidents Roosevelt and Truman. The *Augusta's* war diary indicates that on April 10th, 1945, a J. K. Manning, Seaman 2nd Class, was "lost at sea in line of duty" off of Norfolk, Virginia.⁷¹ The *Augusta's* captain, Edward Jones, officiated a joint memorial service for Manning and President Roosevelt, who had died on April 12th. According to Johnston, Jones' eulogy was insincere and neglectful of the "lowly seaman,"⁷² and the ship's officers walked out of the ceremony in disgust,

⁶⁷ Joel D. Mlecko, "The Guru in Hindu Tradition," *Numen* 29 (July 1982), p. 37.

⁶⁸ Ben Johnston, interview with William Duckworth in *Talking Music: Conversations with John Cage, Philip Glass, Laurie Anderson, and Five Generations of American Composers* (New York: Da Capo Press, 1989), p. 133.

⁶⁹ Mlecko, "The Guru in Hindu Tradition," p. 37.

⁷⁰ Gilmore, *Harry Partch*, 193-99.

⁷¹ "USS Augusta War Diary—1945," <<http://www.internet-esq.com/ussaugusta/diary/1945.htm>>, accessed November 27, 2007.

⁷² Johnston, personal interview (November 25, 2007).

calling for Jones' dismissal. Indeed, the war diary reports that on May 6th, 1945, Captain Bryan Harper relieved Jones of his command.

This seems to have been a seminal episode for Johnston, shaking his already fractured faith in hierarchical leadership. Although he later sought support from the Catholic Church, which he joined in 1970, he found that Catholic doctrine was insufficient to help him overcome more serious difficulties in his life. Johnston's priest recommended that he consult the Chicago Zen Center to "get to a deeper side of [his] emotions,"⁷³ and this suggestion led him to take up meditation and begin a turn away from Roman Catholicism that was complete by 1995.⁷⁴ *String Quartet No. 4*, a set of variations on "Amazing Grace" completed in 1973, captures in musical homology Johnston's ceaseless spiritual questing and his tempestuous relationship with religious tradition.⁷⁵

Randall Shinn's 1979 analysis of *String Quartet No. 4* presents a thorough investigation of the piece's structure and its strata of proportional organization. He is careful to use the term "centric," instead of "tonal," to describe the quartet's harmonic organization;⁷⁶ however, this distinction is somewhat misleading, because a number of passages in the piece make explicit reference to tonal syntax. Moreover, developmental vectors intrinsic to extended just intonation guide the quartet's negotiation of tonality: the first statement of "Amazing Grace" is harmonized by perfect fourths and fifths—in other words, such 3-limit intervals as $3/2$ and $4/3$. The third variation introduces thirds and sixths, 5-limit intervals; the fourth, 7-limit intervals combined into dense scales that Johnston mines with increasing chromatic thoroughness. These scales generate first blues-like harmonies and then jarring dissonances as the piece continues. The ninth and final variation moves back through 5-limit diatonicism, settling on a thirdless 3-limit tonic chord.

The piece's "centricity" is not limited to the pitch domain—the piece also has a textural "center" and, as we might expect given its variation form, a material "center," the tune "Amazing Grace." It would be more accurate, then, to assert that tonality is implicitly central to the piece, a normative state that is only rarely glimpsed but whose borders are explored rigorously.⁷⁷ The drama of the piece is in the evacuation of and return to these organizational centers—from 3-limit just intervals through 5-limit intervals to 7-limit intervals and back, from placid and homogeneous textures to agitated and heterogeneous ones and back, from clearly identifiable renderings of "Amazing Grace" to almost unrecognizable ones and back. These journeys are not all paced alike, of course: the degree of removal from the normative textural center fluctuates widely with each variation, whereas the harmonic narrative unfolds in a more (though not entirely) linear manner. Moreover, Johnston punctuates the piece with musical referents, including a Partch quote (m. 20) and a descending pizzicato figure in the cello reminiscent of the passacaglia bass (m. 83). At the very end of the piece, all "centers" have been reached; a plagal cadence on G (lowered by a syntonic comma), perhaps the richest allusion in the

⁷³ Ibid.

⁷⁴ Gilmore's introduction to Johnston, *Maximum Clarity*, p. xxvii.

⁷⁵ Ben Johnston, *String Quartet No. 4* (Baltimore: Smith Publications, 1973).

⁷⁶ Randall Shinn, "Ben Johnston's *Fourth String Quartet*," *Perspectives of New Music* 15 (Spring-Summer 1977), p. 147.

⁷⁷ This may be the best way to generalize the aforementioned "consonant" composers—they recognize the normative quality of consonance.

entire quartet, concludes the final bar.

The legibility of *String Quartet No. 4* as an account of Johnston's spiritual turmoils roughly contemporaneous with his conversion to Roman Catholicism is fairly obvious, but such a reading problematizes both the piece and Johnston's former Catholic affiliation. Johnston is forthcoming about the reasons for his forswearing Catholic dogma; broadly speaking, he feels that the church's insistence on "a definite way to do things" is misguided: negotiating the difficulties of real life is "not that easy at all and never was."⁷⁸ Likewise, *String Quartet No. 4* is open to the criticism that its affirmatory conclusion, similar to but more vigorous than its beginning, offers a kind of false redemption: what marks do the quartet's excursions into dissonance and fragmentation leave on the body of the work? The piece's solution seems perhaps too pat, too easy, the conflicts that arise within it vanquished too peremptorily. In fact, Johnston sees a clear parallel between the direct, one-to-one correlation of interval quality with "emotional meaning" and religious doctrine: "That's like the Catholic Church." "Happily ever after," the composer says, "doesn't work."⁷⁹

Johnston's solution to this aesthetic problem is to craft expressions of the ideal by "harmonizing" the parameters of music into a cohesive whole.⁸⁰ (On a larger scale, Johnston incorporates this directive into advocacy, not unlike Partch's, for the reintegration of physical, mental, and emotional energies in music.⁸¹) The affective arc of *String Quartet No. 4* is ultimately incompatible with such unity because in order for its narrative ramifications to be truly convincing, it must sacrifice some of its structural integrity, its claim to be a realization of a single principle at every level. The "emancipation of consonance," as Johnston defines his project, demands a higher, more totalizing "harmonization." With respect to the problem of dramatic agonism, Johnston mentions Shakespeare: the playwright wrote comedies to reveal possibilities transcending those offered by everyday life, Johnston argues—an alternative to the fundamentally egocentric art of tragedy.⁸²

Just as Partch was dedicated to the search for an "enchanted land," Johnston's music strives to give voice to that which is verbally incommunicable. He cites intervals in a *raga* that, once understood, convey "an emotional concept beyond words."⁸³ Johnston's meticulous research into extended just intonation, differing from Partch's in both compositional sophistication and emphasis on realization with conventional (i.e., not specially constructed) instruments, is undertaken for many of Partch's same reasons: a restored connection to the body and acoustic reality; a corrective to the homogenizing influence of equal temperament; and the possibility of a utopian expressive medium made viable by a more intelligible consonance/dissonance relationship. The tensions in these composers' musics results, in part, from the struggle to achieve a dialectic of the ancient and the modern. Their challenge is to write music that uses forgotten, neglected means to produce something original, music that represents both a restoration and a progression.

⁷⁸ Johnston, personal interview (November 25, 2007).

⁷⁹ Ibid.

⁸⁰ Ibid.

⁸¹ Johnston, "Maximum Clarity" in *Maximum Clarity and Other Writings on Music*, pp. 171-9.

⁸² Johnston, personal interview (November 25, 2007).

⁸³ Ibid.

La Monte Young

The drive to synthesize the extremely old and arrive at an unthinkable new result reaches its apogee (in the context of this essay, at any rate) in La Monte Young. Young has been tireless in imputing spiritual power to his music; Jeremy Grimshaw contends that Young's "long tones suggest eternal tones, his sustained harmonies aspire to divine, immortal perfection,"⁸⁴ and Young himself has stated that his music aspires to "carry [his listeners] away to Heaven."⁸⁵ Speaking for Young, Grimshaw opines that music and spirituality are "ontologically contiguous."⁸⁶ Although Young understands the mathematical principles behind just intonation, he is interested neither in the possibilities of o- and utonality as proposed by Partch, nor in Johnston's more agile extended just intonation, but rather in the presentation of a relatively small array of pitches, often revealed a few at a time over several hours. Young eschews far more of Western music's expressive convention than do even Partch and Johnston; indeed, his music makes that of Partch, who seemed to have emerged from the wilderness, an alien to tradition, look like a Juilliard prodigy's.

Young's explicitly mystical rhetoric *vis à vis* his music is complemented by a biography full of stories that accentuate his deep connection to the very nature of sound—his fascination with the whistle of the wind blowing through his family's log cabin, the buzz of a telephone pole, etc. Raised in a Mormon household, Young acknowledges that Mormonism "did play an enormously influential role" in his creative development.⁸⁷ The Mormon concept of heaven as a "material rather than ethereal place" locates heaven—transcendence, the "enchanted land," the "emotional concept beyond words"—within striking distance of music's affective power. Furthermore, Young believes that the "Eastern" philosophy he studied assiduously as a younger man "had already been introduced to [him] in Mormonism"⁸⁸; this conviction has allowed his religious formation in childhood to continue to pertain to his activities up to the present day.

Later, in Los Angeles, Young was quite a noteworthy jazz saxophone player, competing with Eric Dolphy (successfully) for a seat in the Los Angeles City College dance band. He studied at Berkeley alongside David Del Tredici, Pauline Oliveros, and Terry Riley, writing music reminiscent of stretched-out Webern, then worked with Cage, Stockhausen, and David Tudor at Darmstadt. When he moved in 1960 to New York, where his largest and most ambitious pieces would be composed and performed, he quickly became a fixture of the "downtown" scene. His lengthy association with Pandit Pran Nath in New York was instrumental to his growth, in large part because of the transcendent significance he began to attach to harmonic intervals while singing Indian classical music with Nath.⁸⁹

⁸⁴ Jeremy Grimshaw, "The Sonic Search for Kolob: Mormon Cosmology and the Music of La Monte Young," *repercussions* 9 (Fall 2001), p. 82.

⁸⁵ La Monte Young, interview with Richard Kostelanetz in *The Theater of Mixed Means: An Introduction to Happenings, Kinetic Environments, and Other Mixed-Means Presentations* (New York: RK Editions, 1980), p. 186.

⁸⁶ Grimshaw, p. 91.

⁸⁷ *Ibid.*, p. 93.

⁸⁸ *Ibid.*

⁸⁹ La Monte Young, interview with William Duckworth in *Talking Music: Conversations with John Cage*,

Without accusing Young of gradually constructing a retroactive personal mythology that highlights those moments best reinforcing his image as an innovator, it seems fair to note that the puzzle pieces of his biography fit together preternaturally well to form a picture of Young that emphasizes his credentials, both spiritual and musical, as a vessel of musical spirituality. At any rate, it is clear that exploring new means of music-making while maintaining his dedication to what would eventually be known as drone-based minimalism has always been a priority for Young, and moreover that such exploration has since at least 1970 (when he met Pandit Pran Nath) been conformable to Young's mystical, "heavenward" project.⁹⁰ Since Young's exposure to rational tuning *grace à* Tony Conrad in 1962, just intonation has been of paramount importance in the pursuit of this project. Like Partch and Johnston, Young acknowledges the acoustic primacy of pure intervals, but he articulates this primacy in terms even more assertive than Partch's and Johnston's: "Equal temperament reminds one of the truth; just intonation is the truth."⁹¹

The Well-Tuned Piano, Young's magnum opus, is his emblematic attempt to put this axiom into musical practice—or, at least, to create a space (for more than six hours, in the piece's most recent version) wherein Young can persuade the listener that his claim is legitimate. A piece for solo piano in an idiosyncratic 7-limit tuning that emerged from improvisations beginning in 1964 and theoretically still incomplete, *The Well-Tuned Piano's* ontology *qua* a performable piece of music has evolved along several axes during its development: not only has it gained more motives, patterns, and sections, but the tuning has been adjusted—once in 1973 and again in 1981—and certain structures, such as the Tamiar and Romantic Chords, have dilated or shrunk in importance as the piece's sequence of events has been rearranged.

A close reading of the most recent (and possibly ultimate) tuning of *The Well-Tuned Piano* reveals Young's harmonic priorities in their most refined manifestation. First, as Gann rightly notes, not all of Young's chromatic scale is arranged in ascending pitch order on the keyboard: the C-sharp key and G-sharp key are lower than their respective natural keys so as to preserve the fingerings of these 3/2 intervals.⁹² The F, E-flat, and B-flat keys are also linked by 3/2 fifths. Because Young eschews 5-limit intervals to avoid conventional thirds and sixths, the margin by which these fifths are the most consonant intervals is wide; thus, the hierarchy of consonance and dissonance incorporating them and their surrounding 7-limit intervals is especially pronounced. Furthermore, *The Well-Tuned Piano's* "clouds," arpeggiated chords that produce swirling harmonics for over an hour at a time in some cases, depend on interactions between overtone content among the germane members of Young's scale. The nature of these complex sonic phenomena is difficult to describe without extensive knowledge of the properties of Young's Bösendorfer (or whichever piano he happens to be playing), the performance space's acoustic, and, of course, the mathematical relationships implied by his scale. Therefore, this may be an area of the piece's development that Young has

Philip Glass, Laurie Anderson, and Five Generations of American Composers (New York: Da Capo Press, 1989), p. 251.

⁹⁰ Grimshaw, p. 103.

⁹¹ La Monte Young, quoted in Potter, *Four Musical Minimalists*, p. 88.

⁹² Kyle Gann, "La Monte Young's *The Well-Tuned Piano*," *Perspectives of New Music* 31 (Winter 1993), p. 141.

pursued through trial and error, pushing his tuning toward configurations that yield satisfactory "clouds" without necessarily analyzing the pertinent variables away from the piano.

In its first 1964 performance, *The Well-Tuned Piano* was only forty-five minutes in length, but since then it has expanded, through the interpolation, augmentation, and mutation of its material, to over six hours.⁹³ Kyle Gann proposes that *The Well-Tuned Piano* is apprehensible via "Western" and "Eastern" modes of listening, linking the "Western" mode to constructivist, developmental perception and the "Eastern" mode to ambient perception. By drawing such a simplistic dichotomy, Gann situates himself uncomfortably close to the unstable tropes of "East" and "West" that have always been a liability of the American experimental tradition and to which Young himself is by no means immune; however, he is correct in identifying a linear narrative in *The Well-Tuned Piano*. The 1987 performance recently released on DVD moves through portentous chordal material and several lengthy "clouds" to eventually reach a sort of species counterpoint about an hour before the piece ends, followed by a final passage reminiscent of the very beginning, the piece's primordial innocence. Thus, both the genesis and growth of *The Well-Tuned Piano* itself and the substance of its most recent incarnation are mimetic, speculative creation myths. The names of the piece's chords and sections are of course another realm of connection to the mystical, and Young sees a link between the piano's tuning and "the lyre of Orpheus and the harp of David."⁹⁴ Whether the piece's evolution from 1964 to today will end, like the dramaturgy of the piece itself, in a glorious, transcendent renaissance is unknown.

Although *The Well-Tuned Piano's* network of allegory and aura by no means outlines a literal religious text—encoding, or rather, Young's vision of cosmic time—Young is much more concrete and explicit than his predecessors when discussing the specific spiritual effects of his music. Partch and Johnston make it clear that just intonation imbues their pieces with a connection to the mystical, but it would be very reasonable to ask just what kind of connection they might be seeking, and for whom—for their listeners, for their performers, or for themselves? Whereas Young is quite frank about his music's simulation of the Mormon concept of heaven and its suspension of mortal time as an indispensable part of the listening experience, Partch and Johnston are as concerned with the representational, exemplary potential of their work, its capacity as a model for social and artistic reform; they are composing for the over-hearer, so to speak, as much as for the listener, and their focus on the physicality of performance as a spiritual desirable suggests that their performers, too, are to be included in the congregation. Particularly in Johnston's case, there may furthermore be a devotional, therapeutic, or at least meditative side to the act of composing music in just intonation, a benefit that the composer is surely within his rights to enjoy. Whether the audiences and performers in question should be expected to graciously receive the painstakingly tuned utopian Eucharists offered by Partch, Johnston, and Young is, however, less certain; all three of these composers are vulnerable to the criticism that their insistence on the spiritual essence of their creative production is simply mystification, an allegation that later just intonation specialists would assiduously seek to avoid.

⁹³ Ibid., p. 137.

⁹⁴ La Monte Young, interview with Frank J. Oteri, <http://www.newmusicbox.org/article.nmbx?id=2216>, accessed November 28, 2008.

James Tenney and Beyond

At the risk of implying a historical progression in what may be simply a succession of variously inclined artistic temperaments, Young's *The Well-Tuned Piano* seems to represent an apotheosis of the tendency to conceptualize just intonation in supernatural terms. Note that Young's eagerness to attach spiritual significance to pure tuning is greater than Johnston's, and Johnston's greater than Partch's. Why, then, is there no monastic brotherhood of just intonation acolytes secreted away in California's Central Valley? Why is extended just intonation still, more or less, a fringe community within the fringe community of contemporary concert music? To the author's knowledge, no composer since Young has embraced the putative mystical potential of just intonation with such fervor. Even Young's contemporary Terry Riley takes a much less dogmatic view of the situation, approaching just intonation as a desirable rather than a necessity.

Perhaps the increased reluctance to discuss pure tuning in terms of the infinite owes to a social climate that has only become more skeptical of mysticism since the late 1960s, when La Monte Young's generation of composers came of age. Moreover, the co-opting of spirituality for political ends that has characterized the past thirty years is a discomfiting development; the appearance of such pieces as Andres Serrano's *Piss Christ* in 1989 and Chris Ofili's *The Holy Virgin Mary* in 1996 is a clear indication of a compulsion among visual artists to problematize religious conservatism in its capacity as an enforcer of power relationships. The domination of the American new music discourse (although by no means the American new music scene) by positivistic compositional and analytical positions that have no room for voodoo—discourse into which Johnston and Partch are admitted only by virtue of their rigorous mathematical rationalizations and notational advancements and from which Young has been until recently excluded—has created a critical environment not welcoming to aesthetic philosophies that point to Partch's "enchanted land," for example. In more practical terms, the powerful current of integral serialism, whose reliance on transpositional and inversive equivalence demands even divisions of the octave, has helped cement equal temperament's normative dominance; and although tuning by ear remains an important skill among professional musicians and students, the arithmetic of just intonation is seldom part of the curriculum.

Regardless of just intonation's alleged spiritual privilege, the acoustic facts of simple ratio tuning cannot be denied; one need not subscribe to La Monte Young's rhetoric, or even Ben Johnston's or Harry Partch's, to appreciate the sound of pure intervals and the mathematical principles behind them. The same acoustic research that made just intonation feasible forms the foundation (augmented, of course, by contemporary hardware and software) for spectral music. Likewise, the project of tempered microtones has been taken up, chiefly in Europe, by deconstructionist composers—including the first generation thereof, the so-called "New Complexity" community of British composers. Finer divisions, even or uneven, of the octave permit greater adjacency to just intervals. One interesting and relatively recent development that may point to an emerging dialectic of just intonation and equal temperament is the exploration of twelfth-tones, which is to say six steps per semitone or 72-tone equal temperament. The tempered twelfth-tone, equal to 16.666 cents, can be compounded seven times into a seven-twelfth-tone only five cents larger than a 16:15 just semitone, a

simple 3-limit interval.⁹⁵ The American composer Franklin Cox uses 72-tone equal temperament to achieve a highly refined harmonic system capable, with only very slight contextual adjustments,⁹⁶ of both serial pitch manipulation and a genuinely audible consonance/dissonance continuum. (Cox, also a cellist, plays Bach's solo suites in Ben Johnston's extended just intonation.)

However, as a composer whose journeyman period was spent in Germany and whose musical allegiances lie, by and large, in Western Europe, it would be disingenuous to locate Cox's work in the American experimental tradition as exemplified by Partch, Cowell, and Young. Instead, it may be informative to return to James Tenney, who was mentioned earlier in the context of his early encounter with Harry Partch at the University of Illinois. Tenney's 1985 piece *Water on the mountain. . . Fire in heaven* for six electric guitars ("as similar as possible, if not identical") tuned a twelfth-tone apart from each other provides a useful example.⁹⁷ Because the guitars' sound is homogeneous (the guitarist Seth Josel recorded the piece by overdubbing the same guitar six times) and Tenney writes long, elided phrases, they fuse perceptually into a single instrument that seems to play in twelfth-tones. Because each guitar's strings are tuned in equal-tempered fourths and major thirds and fretted in equal temperament, the piece cannily "reminds one of the truth," its harmonies alluding constantly to 3-limit just intonation and inviting meditation on the difference between tempered and just intervals. Nowhere in the score, however, does Tenney make mention of frequency ratios, notating the guitars' *scordatura* in rounded cents and specifying that each is tuned to a tempered fourth two cents removed from a Pythagorean 4/3 fourth.

It would be too easy to draw an analogy between Tenney's lapsed Mormonism⁹⁸ and his mediated, circumspect tuning practice in *Water on the mountain. . . Fire in heaven*. For one thing, many of Tenney's pieces (beginning with 1972's *Quintext: Five Textures for String Quartet and Bass*⁹⁹) specify just intervals in no uncertain terms. For another, Tenney took Partch's work as "an indispensable technical point of departure, just as Cage's work has provided us with an essential aesthetic foundation"¹⁰⁰; the avowedly non-rhetorical goals of his music are not in line with Partch's, Johnston's, or even Young's, but rather with Cage's.¹⁰¹ Furthermore, Tenney has no use for the idea of utonality, rejecting it (and, by extension, undertone/overtone dualism) as a myth without acoustical basis.¹⁰² Note also that, like Cox (and, in a simpler manner, Johnston), Tenney applies tuning theory to the resynthesis of a consonance/dissonance hierarchy—namely, his concept of "harmonic distance"—although consonance is not necessarily a normative

⁹⁵ Joe Monzo, "7/12 tone, seven-twelfth-tone," <<http://tonalsoft.com/enc/number/7-12th-tone.aspx>>, accessed November 19, 2007.

⁹⁶ In an interview with William Duckworth, Ben Johnston mentions that the composer Ezra Sims uses a similar method of writing quarter-tones (tempered, not explicitly undecimal) and adding verbal notes to indicate "fudging" toward just intervals.

⁹⁷ James Tenney, *Water on the mountain. . . Fire in heaven* (Baltimore: Smith Publications, 1985).

⁹⁸ Grimshaw, "The Sonic Search for Kolob," p. 106.

⁹⁹ James Tenney quoted in Bob Gilmore, "Changing the Metaphor: Ratio Models of Musical Pitch in the Work of Harry Partch, Ben Johnston, and James Tenney," *Perspectives of New Music* 33 (Winter-Summer 1995), p. 484.

¹⁰⁰ James Tenney, "Reflections after *Bridge*," *Bridge* (Baltimore: Smith Publications, 1984).

¹⁰¹ James Tenney, interview with Frank J. Oteri, <<http://www.newmusicbox.org/article.nmbx?id=4247>>, accessed November 29, 2007.

¹⁰² Tenney, quoted in Gilmore, "Changing the Metaphor," p. 488.

state in the world of Tenney's music.

The qualifiers and caveats that accompany Tenney's place in the lineage of American experimentalists who worked extensively with just intonation reinforce the degree to which the idea of such a lineage is untenable except as a constellation of pedagogical relationships and personal encounters. Tenney and La Monte Young, born only a year apart, are mirror images, so to speak: shared Mormon heritage aside, Tenney's formative experiences include a stint at Bell Laboratories, where he became heavily invested in the science of musical sound. Furthermore, the two men seem to have had wildly different temperaments (no pun intended). It is as difficult to imagine Young working alongside Max Mathews in the shadow of a gigantic mainframe as it is to envision Tenney, who lasted only six months as Partch's assistant in Urbana, submitting himself to Pandit Pran Nath's authority.¹⁰³ In addition to his music, Tenney, like Johnston and Partch before him, has left a body of scholarship and a legacy of students to keep building upon it—for example, Marc Sabat, a Canadian composer and violinist whose output includes not only concert and installation works, but also guides to tunable intervals on various standard instruments and a typeface that provides a wide variety of just intonation accidentals for use in notation software.¹⁰⁴ Although Young's music has been highly influential—more so, perhaps, than Tenney's—none of it has been published, and it is not complemented by a scaffold of theoretical literature. Young has never been active in the academy; his students of composition have been very few.

The central question of this study, then, actually expands into two questions: how did spirituality and just intonation (more generally, consonance) become linked in the minds of American experimental composers, and later on, how did these things become un-linked? To oversimplify: they became linked through Henry Cowell's efforts to make necessary technical information available and Harry Partch's to resuscitate ancient connections between just intonation and spirituality, connections which were then refined and problematized by Ben Johnston. A number of circumstances conspired to un-link these associations, including (but not limited to) the lucidity of James Tenney, who kept aloft Partch and Johnston's thread of research, and the inscrutability of La Monte Young, who viewed (as did Partch and Johnston) just intonation as the "truth," making it his *raison d'être*.

¹⁰³ Gilmore, *Harry Partch*, p. 287.

¹⁰⁴ "PLAINSOUND MUSIC EDITION," <<http://www.plainsound.org>>, accessed November 29, 2007.