Music of a "More Exalted Sphere": The Sonic Cosmology of La Monte Young

Jeremy Grimshaw

Orientation: A Visit to Gilgal Garden

SEVEN AND A HALF BLOCKS EAST and five blocks south of the Salt Lake Temple, the 0,0 of the city's cardinally aligned grid, an inconspicuous gate on the north side of the street opens onto a long path that leads to what was once the backyard of Thomas B. Child. A stonemason by trade and Mormon bishop by calling, Child spent many of his spare moments between 1945 and 1963 designing surreal and sacred sculptures and engraving poignant aphorisms into stone tablets, gradually creating one of the most unique (and, even to most Mormons, unknown) collections of folk art in the United States. His bizarre rendering of the Sphinx is the first thing one notices upon entering the garden, its face bearing the unlikely

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JEREMY GRIMSHAW is a doctoral candidate in musicology at the Eastman School of Music and, during the 2004–05 academic year, a visiting assistant professor of fine arts at Syracuse University. His articles have appeared in the *Musical Quarterly*, the *Journal of Musicological Research*, *repercussions*, and *Intervals*. He lives in Pittsford, New York, with his wife, Kristen, and their three sons. An earlier version of this article, "The Sonic Search for Kolob: Mormon Cosmology and the Music of La Monte Young," appeared in the musicological journal *repercussions* 9, no. 1 (Spring 2001): 78–120. The author expresses appreciation to Daniel Albright, David Claman, David Cook, David Doty, Michelle Green, Gabriela Ilnitchi, Ralph Locke, Alan Pierson, Chris Rice, Martin Scherzinger, Lane Twitchell, Ervin Wilson, and especially to Kristen Grimshaw, La Monte Young, his father, Dennis Young, and Marian Zazeela.

The Young family's log cabin in Bern, Idaho. Photo by Jeremy Grimshaw.

likeness of Joseph Smith Jr., its chest ornamented with an engraved depiction of the Salt Lake Temple's western towers (specifically, the upper tower's relief of the constellation Ursa Major).

Proceeding in a loop around the garden, one comes across the scattered anatomy from Nebuchadnezzer's dream, an arch of stones crowned with the symbols of Alpha and Omega, and even a statue of Child himself, carrying, under his left arm, rolls of blueprints, and under his right, the holy scriptures. Before him lie intersecting paths made of broad flat stones, each engraved with unreferenced scriptures, uncited hymn verses, and unattributed quotes, such as:

> THAT IT SUGGESTS INFINITE WISDOM, A PAST WITHOUT BEGINNING AND A FUTURE WITHOUT END, A REPOSE AFTER LIMITLESS EXPERIENCE, A PEACE TO WHICH NOTHING MATTERS.

Or:

> FOR BEHOLD THIS IS MY WORK AND MY GLORY–TO BRING TO PASS THE IMMORTALITY AND ETERNAL LIFE OF MAN.

And perhaps most pertinent to the discussion that will follow here:

> FACTS BECOME ART THROUGH LOVE, WHICH UNIFIES THEM, AND LIFTS THEM TO A HIGHER PLANE OF REALITY.[1]

A Log Cabin in Bern, Idaho

Exiting from the garden, one drives west on 500 South to the I-15, then on to Highway 89 north, eventually crossing the state line near Bear Lake—the northwest shore of which laps at the edges of Bern, Idaho. The main road through this community of 261 residents runs past the old schoolhouse, and, a stone's throw further on, the humble log cabin where La Monte Young spent the first few years of his life. This is the site of one of the earliest and most poignant images in any of Young's biographical reminiscences: the composer-to-be lying in bed, not yet two years old, drinking from a bottle and listening to the wind whistle across the gaps between the logs. "It was very awesome and beautiful and mysterious," Young recalls. "As I couldn't see it and didn't know what it was, I questioned my mother about it for long hours."[2]

Just about everyone who writes on Young begins the story with this anecdote or others like it that he provides, all with a similar soundtrack: the hum of insects in the sagebrush fields surrounding the Bern schoolhouse, or perhaps the quiet and complex harmony generated by an electrical substation in nearby Montpelier.

The appeal is obvious; such sounds resonate—both figuratively, and, in some cases, quite literally—with the works that have earned La Monte Young his reputation as one of the most enigmatic and conceptually intractable composers in history. His *Composition 1960 #7*, for example, simply provides the performer with a B and an F#, which are "to be held for a

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1. The sources are, respectively: John Hay, in an 1891 letter to Henry Adams, on the bronze statue marking the grave of Adams's wife Marian; Moses 1:39; Kenneth Clark, *Landscape into Art* (London: J. Murray, 1949), 16.

2. Quoted in Richard Kostelanetz, *The Theater of Mixed Means: An Introduction to Happenings, Kinetic Environments, and Other Mixed-Means Presentations* (New York: RK Editions, 1980), 186.

long time."[3] His *Trio for Strings* (1958), recognized by one author as "the virtual fountainhead of [musical] minimalism,"[4] is constructed of hushed chords, built and sustained over incredibly long spans, separated by silences lasting up to forty seconds. *The Second Dream of the High-Tension Line Stepdown Transformer* (1962) involves hours of group improvisation, within given parameters, upon pitches inspired by Young's recollection of that humming substation in Montpelier. This sonic thread of long sustained tones draws together the highly disparate worlds Young has inhabited during his life: on the one hand, the geographic and sonic landscape of the rural West where he grew up and, on the other, the minimalist movement he helped to pioneer in New York in the 1960s—a circle that encompassed the drone-dominated underground rock of the Velvet Underground (who counted Young as a principal musical mentor), the static films of Andy Warhol (which Warhol created shortly after attending the New York premiere of Young's *Trio for Strings*), the Spartan art of Yoko Ono (with whom Young was close friends), and an entire school of musical composition dedicated to the acoustical realities and intricacies of static sonorities and "sound itself."

Virtually all of Young's compositions, in their explorations of long tones and sustained harmonies, defy normal conceptions of teleology and temporality. There is no dramatic contour that develops over time, no tensions to be resolved, no building up to a goal; his works seem to have arrived at their goal long before we begin listening. If hearing Western music is like being carried along by the current of a river, listening to La Monte Young's music is like being held afloat on a lake. "One of the aspects of form that I have been very interested in is stasis—," says Young, "the concept of form which is not so directional in time, not so much climactic form, but rather form which allows time . . . to stand still."[5] One writer has asked rhetorically, "Does [Young] write for 'now' or for poster-

3. I attended a performance of the piece on June 20, 2001, in New York City, given under the composer's supervision. It lasted about eighty-five minutes.

4. K. Robert Schwarz, *Minimalists* (London: Phaidon, 1996), 23.

5. La Monte Young and Marian Zazeela, interviewed by Ian Nagoski, in *Halana* 1 (Winter 1995/1996): 30.

ity?"[6] The answer is—*no*. His works do aspire to immortality but not merely in the music-historiographical sense. Young reaches into the distant past and resurrects sonorities from his memories as if they had always sounded and always will; his long tones suggest eternal tones, his sustained harmonies aspire to divine, immortal perfection. In fact, it is not unusual for him to speak of his music in these terms: "If [listeners] aren't carried away to Heaven," Young claims, "I'm failing."[7]

While in most accounts of Young's career, his music emerges seamlessly from the hums and drones of his early autobiography, the explicitly spiritual aspirations of Young's oeuvre are usually considered within contexts far removed from the log cabin in Bern. In his contribution to the liner notes for the 1981 recording of Young's monumental work *The Well-Tuned Piano*, composer Terry Riley observes in Young the "power of a Gandharva" and "the patience of a Chinese sage." He speaks of his mentor's masterpiece in reverent tones, wondering at its universal resonance, its global spirituality. "Here, for the first time in Western music, we experience the full-blown metaphysical archetypes of the Far East that infuse the high classicism of Bali, Java, India, and China, borne aloft on a separate ray, a genuine new breath of devotion." Riley solemnly concludes that "this is truth," and later, "this is a holy work."[8]

Such numinous language might sound to the skeptic like a lingering product of the freely appropriated Eastern philosophies (and freely ingested substances) that accompanied Young's arrival on the New York art scene in the psychedelic sixties. Indeed, composer David Claman has recently pointed out the clumsiness with which Western generalizations of the "timeless East" are used to explain Young's music; and both Claman and musicologist Allison Clare Welch have shown ways in which Young's compositional practices involve a much more nuanced combination of elements than such stereotypical geographical dichotomies as "East" and

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6. David Farneth, "La Monte Young: A Biography," liner notes to *The Well-Tuned Piano 81 X 25 6:17:50–11:18:59 PM NYC*, Gramavision CD 79452 (1987), 18.

7. Quoted in Kostelanetz, *Theater of Mixed Means*, 218.

8. Riley, liner notes to *The Well-Tuned Piano*, 2.

"West" would imply.[9] Likewise, although the composer and others frequently describe the spiritual and transcendent qualities attributed to Young's music in exotic terminology, the beginning of Young's heavenly quest far predates and dovetails with his exposure to Eastern religious ideas and 1960s countercultural aesthetics. Due consideration has yet to be given to certain spiritual concepts that have exercised a persistent and pervasive influence on Young's music, namely, the theology and cosmology of Mormonism.

A devoted Latter-day Saint until early adulthood, Young retained certain conceptual paradigms from Mormonism even after abandoning most Mormon religious practices; these paradigms reappear in various terminological adaptations and spiritual contexts throughout his career.[10] By considering his work within the context of Mormon thought, I do not mean simply to replace one myth of origin with another, but rather to demonstrate the extent to which polar models such as "Eastern" and "Western" (which, at best, contrive to fabricate the Exotic, and worst, seek to indict the Other), impose a false sense of opposition or incompatibility between perceived worldviews. This, I hope, will suggest a new way in which to connect Young's biography with his compositional practices

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9. While the research of each scholar takes a valuably detailed look at the connections between Young's work and his interest in Eastern thought, Claman undertakes a much more critical exploration of Young's Orientalist tendencies than Welch, whose analyses ultimately equate affinity with influence. See David Claman, "Western Composers and India's Music: Concepts, History, and Recent Music" (Ph.D. diss., Princeton University, 2001), chaps. 2, 4; and Allison Clare Welch, *The Influence of Hindustani Music on Selected Works of Philip Glass, Terry Riley, and La Monte Young* (Ph.D. diss., University of Texas at Austin, 1997), chaps. 3, 4. See also Welch, "Meetings along the Edge: Svara and Tala in American Minimal Music," *American Music* 17, no. 2 (Summer 1999): 179–99.

10. Though not a practicing Mormon, Young consciously maintains something of a Mormon identity. When I interviewed him and Marian Zazeela on March 4, 2001, Young said that he left Mormonism not because he thought it was false, but because he ceased to believe that it was exclusively true. He still accepts some basic tenets of Mormonism in a rather straightforward way, such as the divine calling of Joseph Smith and the veracity of the accounts given in the Book of Mormon, but he counts them among a number of what he considers true worldviews. In fact, Young is technically still a Mormon. He was quick to assure me that his name still appears on the rolls of the local LDS congregation in lower Manhattan.

and the meanings he projects onto them—not by pitting polarities against each other, but by exploring the affinities shared by seemingly distant cosmologies. Ultimately, after examining these strands of influence, I will consider his music—and the dialogue with which he surrounds it—in rather pragmatic terms: Where and of what kind is Young's Heaven, and how exactly does he propose to get us there?

Tuning, Periodicity, and "Universal Structure"

Since 1993 the third-story loft at 275 Church Street in lower Manhattan has been the home of *The Dream House,* an ongoing "Sound and Light Environment" created by Young and his wife, visual artist Marian Zazeela. The interior of the space is painted and carpeted entirely in white and, on Thursdays and Saturdays from 2:00 P.M. to midnight, filled with the aroma of Nag Champa incense and bathed in purple and magenta lights. A complex and intense cloud of sustained pitches emanates from the enormous speaker boxes in each corner of the room, creating fields of resonance that change with even the most minute movements through the space. Visitors remove their shoes before entering and, once inside, sit or lie on pillows or the floor. There are no chairs. The atmosphere is meditative and otherworldly.

There is an odd duality about this place, however, one that characterizes Young's mature works as a whole. The ethereal and spiritual are coupled indelibly with the mechanical and the material. While the name *The Dream House* seems fanciful enough (and perhaps further evokes 1960s psychedelic stereotypes), the title of the specifically sonic element of the installation is much less approachable: *The Base 9:7:4 Symmetry in Prime Time When Centered above and below The Lowest Term Primes in The Range 288 to 224 with The Addition of 279 and 261 in Which The Half of The Symmetric Division Mapped above and Including 288 Consists of The Powers of 2 Multiplied by The Primes within The Ranges of 144 to 128, 72 to 64 and 36 to 32 Which Are Symmetrical to Those Primes in Lowest Terms in The Half of The Symmetric Division Mapped below and Including 224 within The Ranges 126 to 112, 63 to 56 and 31.5 to 28 with The Addition of 119.*[11]

The two volunteer attendants working at *Dream House* when I first visited in March of 2001 demonstrated this same duality. The first, him-

11. Capitalization as per original. For a brief explanation of the title of the work, see Kyle Gann, "The Tingle of $p \times m^n$-1," *Village Voice,* October 4, 1994, re-

self a composer interested in complex tuning theories, handily and enthusiastically provided information about the mathematical and acoustical principles involved in the sound environment's elegantly complicated pitch content; the second, though just as enthusiastic about the *Dream House,* admitted that his interest was exclusively spiritual and experiential and that he had virtually no understanding of the technical issues involved.[12] What may seem like a duality between the spiritual and the mechanical, however, is, for Young, a continuum. He seeks to traverse (or eliminate) the border between the physical and the metaphysical realms through the musically experiential embodiment of what he calls "universal structure." This term refers generally to the numeric properties of the tuning systems Young employs, the acoustical and psychoacoustical means by which those properties are embodied and conveyed to the senses and the mind, and the way those properties "resonate" with the elegant harmonic structures of the cosmos.

Tuning is perhaps the most fundamental way music can embody cosmology. The most irreducible elements of music—the sounds used and the acoustical relationships between them—tell us something about the irreducible prespace the creator of that music assumes or imagines himself or herself to be operating within. Music, as part of the quadrivium of ancient study, entailed the understanding of "harmony" as it applied to both acoustics and astronomy, the steps of a scale and the music of the spheres; the "musicus," in Boethius's sixth-century definition, was not a performer or composer, but a tuning theorist. Later, in the Renaissance and Baroque periods of Western music history, tuning was a highly variable compositional factor. Composers and theorists developed numerous different tuning systems, and a composer's or performer's choice of tuning for a particular piece could drastically affect its acoustical properties and expressive character. Interest in tuning as a compositional variable gradually waned during the eighteenth and nineteenth centuries, however; and by the turn of the twentieth century, the Western musical establishment

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trieved in November 2002 from Young's website, http://melafoundation.org/gann.htm.

12. Kyle Gann clearly expresses the former sentiment in his review of *The Dream House:* "Let others get their ears massaged by the pulsating drones. I like to gaze at the tuning diagrams and let my mind slither naked through the mysterious clusters of luscious integers." Ibid.

had almost universally accepted the tuning system known as twelve-tone equal temperament, or "12TET," as the recognized standard. While cosmology has emerged occasionally in the narrative content of works from the past century, the ancient connection between acoustics and astronomy, or musical harmony and celestial harmony, has largely disappeared.

Young is thus among a relatively small group of contemporary composers who have resisted the ubiquity of 12TET and have treated tuning as a variable, rather than presupposed, compositional factor. Specifically, since the early 1960s, Young has championed—with "near-evangelical zeal," as Claman puts it—a category of tuning known as "just intonation."[13] The copious liner notes to his most important work, *The Well-Tuned Piano,* include a lengthy essay on the acoustical and artistic possibilities afforded by "just" intervals—or pitch relationships that occur naturally in the harmonic series and that correspond with whole number ratios.[14]

To take a convenient example: On a piano tuned using just intonation, the interval between a G and a C below it can be expressed as the frequency ratio between the third and second harmonics of the overtone series, or 3/2; that is, for every three wave-cycles of the higher pitch, the lower pitch will complete exactly two wave-cycles. The interval, or frequency difference, between any two pitches in a just intonation scale can be expressed as a whole-number ratio in this same fashion: C to D is 8:9, C to F is 4:3, etc.[15] On the other hand, in 12TET the ratios are altered from their natural harmonic occurrences.[16] This alteration is accomplished by employing the following method to divide the octave into twelve equal semitones: 1 semitone = $2^{1/12}$ = 1.0595 . . . In other words, in

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13. Claman, *Western Composers and India's Music,* 247.

14. La Monte Young, "Notes on *The Well-Tuned Piano*: Theory and Acoustical Background," liner notes to *The Well-Tuned Piano,* 5–7.

15. Since harmonic *n* of fundamental frequency *f* has a frequency equal to *f*n,* the frequency ratio of any two harmonics is expressed by the positions of those harmonics within the series.

16. The reasoning behind this relationship defies easy, nontechnical explanation but involves a desire to circumvent a built-in feature of just intonation: the unevenness of scale steps. This unevenness increasingly concerned composers in the eighteenth and nineteenth centuries because their music increasingly tended to change from one key to another. In a just intonation scale, the pitch distance between, say, the first and second scale steps might be different from the distance between the sixth and seventh scale steps; thus, if a composer wanted to render the

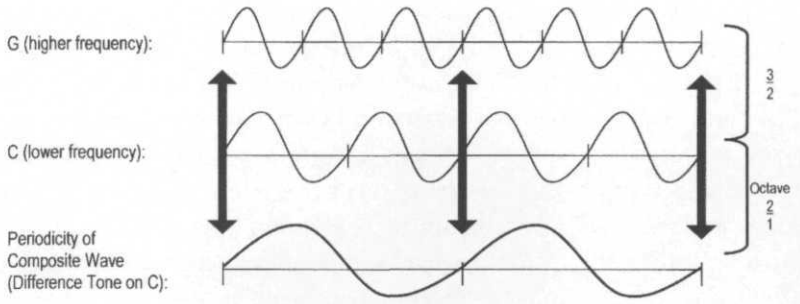

Figure 1. Periodicity of the composite waveform of a G–C dryad tuned to the just ratio of 3/2. The higher pitch, G, completes three cycles for each two cycles of lower pitch, C. The composite waveform exhibits periodicity as the perfect 3/2 alignment continues, causing the ear to perceive a third frequency, on a C one octave below the sounded C.

12TET the ratio between pitches a semitone apart (such as C and C#, E and F, or any other immediately adjacent notes on the keyboard) will be 1.0594 . . . /1, the numerator extending for an infinite number of decimal places (which makes it mathematically irrational, since it cannot be expressed precisely as a ratio).[17] The interval between C and G, described above in just intonation as a 3/2 ratio, can be calculated in 12TET using the same method used above for the semitone, modified to reflect the seven semitones between a C and a G: C-G = $2^{7/12}$ = 1.4983 . . . That is, in 12TET the frequency of the higher pitch is 1.4983 . . . times that of the

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same melody in the home key, or tonic, using the first and second scale steps, and later in a different key, using the sixth and seventh scale steps for the same gesture, the discrepancy between step sizes would make the melody sound different. The equal temperament system of tuning was developed to remedy this problem (and related ones) by making all of the scale steps even, thus facilitating the easy transfer of a musical figure from one key to another.

17. This formula can be conceptualized by thinking of the octave frequency ratio of 1:2 (the acoustical relationship between, say, middle C and the next C above it on the piano) as the ratio of 2^0:2^1, since $2^0 = 1$ and $2^1 = 2$. Just as the distance between 0 and 1 can be divided into 12 equal units of 1/12 each, the distance between 2^0 and 2^1 can be divided into twelve units of $2^{1/12}$ each.

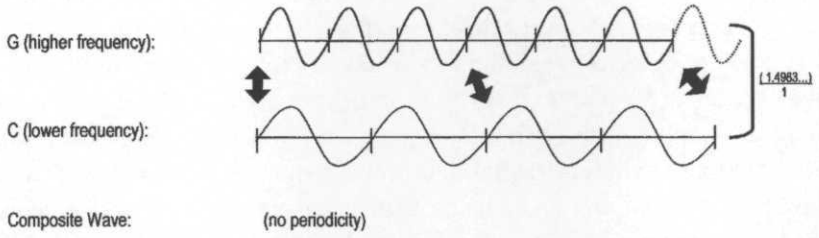

Figure 2. Representation of waveforms of a G–C tuned to the 12TET standard, 27/12, or the ratio of 1.4983. . ./1 (not quite (3/2). The higher pitch, G, completes just under 3 cycles for each 2 cycles of the lower pitch, C. (The misalignment is exaggerated here for illustrative purposes.) Thus, the composite waveform is not periodic.

lower pitch. The sonic discrepancy between a 12TET C-G dyad and a just intonation C-G dyad can thus be thought of mathematically as the difference between 1.5 (or 3/2) and 1.4983 . . . . (See Figure 1.)

For Young, this kind of discrepancy—as it occurs in *any* intervallic relationship—has important acoustical ramifications: since the intervallic factors in equal temperament are irrational numbers, the pitches they indicate never can be precisely in tune, even theoretically. He argues that our ears and brains are sensitive to whole-number ratios as they occur in the harmonic series, in that such ratios produce periodic composite waveforms, or combined waveforms that align with each other at regular points in time. The relationship of periodic composites to the natural harmonic series can actually be made audible: In an interval tuned to the ratio of 3/2 (as in the G-C dyad of the earlier example), the periodic points of alignment between the two sounding pitches can articulate and make audible the frequency of another pitch one octave below the lower of the two. (See Figure 2.) On the other hand, when an irrational tuning such as 12TET is used, the waveforms never quite align and the composite thus exhibits no periodicity.

Young uses research in the area of aural cognition to suggest that our brains attune to the composite periodicities of rationally tuned intervals in special ways. As we hear the same periodic wave form over and over again, the same specific neural receptors and transmitters in our brains and ears

are stimulated. Continued exposure to such harmonies, Young suggests, can potentially simulate or even create certain moods, feelings, or states of mind.[18] Furthermore, according to Young, the perception of composite waveform periodicity as exhibited by just-tuned intervals communicates to the listener the perfection of the proportions with which they are constructed, tapping into what the composer describes as intuitive or anamnestic human sensitivities to universal principles of vibrational structure: "The sensations of ineffable truths that we sometimes experience when we hear progressions of chords and intervals tuned in just intonation, may indeed be our underlying subliminal recognition of the broader, more universal implications of these fundamental principles."[19] In short, Young believes that intervals based on the harmonic series resonate with the macrocosm in a way that irrational intervals cannot. "When I hear intervals in [12TET], it's like they *remind* me of the truth," says Young, "whereas when I hear intervals in just intonation, it's as though I'm *hearing* the truth."[20]

Comprising up to six and a half hours of slowly unfolding improvisations on just-tuned harmonies, *The Well-Tuned Piano* thus assumes the status of a grand cosmic treatise, a sweeping, sonic revelation of "universal structure." Again, Terry Riley endorses it as divinely inspired: "[Young] has given us a work that . . . is crafted in such an original profound manner as to make us feel that it is the product of a large unknown tradition, aged and mellowed over peaceful centuries of development and of whose shamanic wisdom he is the sole heir."[21] Young also sees himself as a kind of musical prophet and speaks matter-of-factly of his divine mission. "[I had] a calling

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18. Young, "Notes on *The Well-Tuned Piano*," 5–7. In this discussion, Young draws heavily upon unpublished acoustical research by Christer Hennix and John Molino. Both Hennix's and Molino's studies address Young's music. Published acoustical writings are cited as well, though none dealing with Young's music specifically. A full investigation of Young's acoustical claims is beyond the scope of this paper, which deals primarily with the nature and provenance of Young's assertions rather than their acoustical and psychoacoustical validity.

19. Ibid., 7.

20. Quoted in Ramon Pelinski, "Upon Hearing a Performance of *The Well-Tuned Piano* [Part I]," interview with La Monte Young and Marian Zazeela, *Interval: Exploring the Sonic Spectrum* 4, no. 3 (Spring 1984): 18.

21. Riley, liner notes to *The Well-Tuned Piano*, 2.

to become what I became. . . . I was created to do this."[22] He insists that, by studying his music, "the soul becomes capable of developing to a higher state of evolution."[23] In fact, according to Young, learning true cosmic harmony is the *principal* purpose of earthly existence. He claims that "God created the body so that the soul could come to Earth to study music so that it could have a better understanding of universal structure."[24] In short, Young sees himself as a divinely appointed, predestined restorer and refiner of ancient knowledge, a receptor for certain fundamental truths of existence, which he articulates through music.

Although Young is certainly not the first Western composer to claim divine appointment, he definitely counts among the most uncompromising in rhetoric and most literal in assertions: For him, music and spirituality are not just related, but, on some level, ontologically contiguous; accordingly, in his view, a musical prophet is a prophet of the highest order. Young's sense of calling thus shares certain affinities with the deeply integrated musical and religious traditions of India. Just as the raga singer's proximity to God is reflected in the purity of his intonation with the constant drone of the tambura, Young's music seeks the celestial realm through the cosmic purity of periodicity. Indeed, having studied Indian classical music for over thirty years with esteemed singer Pandit Pran Nath, Young often invokes this and other Indian metaphors in describing the musical-spiritual continuum he seeks to traverse.

Still, although most discussions of his music and character inevitably connect Young's strong self-concept as well as his compositional practices to Indian music and thought, his initial exposure to such ideas only served to reinforce attitudes and philosophies he had already begun to develop. Likewise, although his early emergence as a composer and musical thinker corresponded chronologically with a gradual distancing from his religious upbringing, his rhetoric and, as we shall see, his compositional practices fit quite comfortably within certain Mormon conceptual frameworks. In fact, when I interviewed him for this study, Young stated outright that his later spiritual developments were erected atop the conceptual foundation of his Mormon upbringing: "There's no question in my

22. Young and Zazeela, interviewed by Nagoski, 39.

23. Ibid., 25.

24. Quoted in David Toop, *Ocean of Sound: Aether Talk, Ambient Sound, and Imaginary Worlds* (London: Serpent's Tail, 1995), 177–78.

mind that principles of Mormonism did play an *enormously* influential role in the shaping of [my] music. Sure, I was also gradually becoming acquainted with Eastern thought . . . but it was like something that was an old friend, because of the way it had already been introduced to me in Mormonism."[25] In this same interview, Young subsequently drew several parallels between Mormonism and various Eastern philosophies, finally concluding that every prophet from Buddha to Mohammed to Joseph Smith articulated a different facet of the same divinity. After all, Young pointed out, when a Mormon ends a prayer with "In the name of Jesus Christ, Amen," he or she utters virtually the same sentiment as the Hindu who says "OM, Nama Narayana": Nama, meaning "in the name of"; Narayana, another name for Vishnu; and OM, the sacred syllable, a gesture of attunement.[26] Accordingly, one can read Young's works and his frequently Eastern-oriented rhetoric as tropes on Mormon theology and cosmology—and indeed, the composer's own comments seem to encourage this kind of reading.

A Log Cabin at Palmyra

From Rochester, New York, where I now write, one follows Route 31 about twenty miles out of town, through Pittsford and Macedon to the village of Palmyra. Heading south from the four churches clustered at the intersection in the middle of town and turning right on Temple Road, one eventually encounters another tiny log cabin, a replica of the one that stood on the same spot in 1820 when Joseph Smith Jr. received the first of his numerous divine visitations. Appearing before him in the air of the Sacred Grove in a column of light, God the Father and Jesus told Joseph that he should not join any of the sects then vying for his conversion. The preachers of Christianity, Jesus said, "draw near unto me with their lips, but their hearts are far from me. . . . They teach for doctrines the commandments of men, having a form of godliness, but they deny the power thereof" (JS—History 1:19). They told Joseph that certain fundamental truths had been lost during centuries of doctrinal apostasy, and that he had been chosen to initiate the restoration of those truths to the Earth.

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25. La Monte Young and Marian Zazeela, interview by Grimshaw, New York, March 4, 2001.

26. Ibid.

La Monte Young and Marian Zazeela, New York City, 2000 (standing in front of 1960 Zazeela painting, Mount Anthony*). Photo Jung Hee Choi. Copyright Jung Hee Choi 2000.*

The religion that emerged from this and subsequent heavenly encounters did not seek to oppose traditional Christianity so much as to circumscribe it, to house it within a broad and forgotten cosmological framework. As Erich Robert Paul, a historian of science, observes, "While Christ and the atonement remain the central feature of the Mormon religious message, for Mormons the atonement became understandable most forcefully in the context of a universal vision that encompasses past, present, and future states of humankind."[27] This "universal vision" is described in its most explicit terms in the Book of Abraham, where God shows the eponymous prophet a vision of humankind in its premortal, spiritual state and explains how these spirits had already demonstrated certain aptitudes and qualities of obedience and intelligence. Abraham's

27. Erich Robert Paul, *Science, Religion, and Mormon Cosmology* (Urbana: University of Illinois Press, 1992), 99.

vision depicts God, the father of all the spirits and "the most intelligent of all," assembling his children in a great council and assigning to some of them particular mortal stewardships before sending them to Earth.

Abraham's vision of the preexistence exemplifies a central tenet of Mormon religion and culture: the concept that each human had a distinct premortal identity and certain acquired skills or talents that qualified her or him for "foreordination" to specific duties or challenges during mortality. Ecclesiastical leaders, intellectual figures, gifted artists and musicians, and otherwise notable individuals are thus commonly thought of as having been groomed for their prominent earthly roles during their pre-earth existence.

This "universal vision" likewise encompasses human beings' post-earth state, which holds the possibility of gradually and asymptotically approaching the intelligence and power of Deity. Preparation for this lofty goal is the design of earthly existence since, according to one of the revelations of Joseph Smith:

> Whatever principle of intelligence we attain unto in this life, it will rise with us in the resurrection.
>
> And if a person gains more knowledge in this life . . . than another, he will have so much advantage in the world to come. (D&C 130:18–19)

In fact, Mormons believe this process to be a continual cycle; Lorenzo Snow, one of Smith's successors to the presidency of the Church, summarized the Mormon "universal vision" in more direct terms: "As man is, God once was. As God is, man may some day become."[28]

Considered in this context, La Monte Young's discourse assumes a clearly Mormon timbre. The title of his most important work, *The Well-Tuned Piano,* articulates a strong restorational tone: It rhetorically seeks to displace J. S. Bach's venerable collection *The Well-Tempered Clavier,* which, with its methodic exploration of all twenty-four major and minor keys, has come to symbolize the ubiquity and inevitability of the 12TET system.[29] Young's latter-day answer to Bach seeks to reestablish communication with Deity through long-dormant lines of transmission, lines which can be reactivated only by a tuning system acoustically pure enough to reso-

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28. Quoted in Thomas C. Romney, *The Life of Lorenzo Snow* (Salt Lake City: Deseret News Press, 1995), 46.

29. While *The Well-Tempered Clavier* does stand as a symbol of equal temperament's universal institutionalization, musicologists generally agree that the

nate with the universe itself. We might well recall at this point Young's statement about equal temperament *reminding* him of the truth while music in just intonation *is* the truth, and compare it to Jesus's words to Joseph Smith in the grove: that various Christian religions demonstrated only "a form of godliness," while "denying the power thereof."

Young's efforts to raise the soul "to a higher state of evolution" through aural lessons in universal structure—that is, microcosmic lessons in macrocosmic principles—aspire to a distinctly divine pedagogy. Young thus sees himself just as he had been taught as a child to see Joseph Smith: as a prophet chosen by God to restore eternal truths that had been hidden during a long period of apostasy—truths with the potential to transform the mortal into the divine. To paint a particularly vivid—and particularly Mormon—image, one might picture Young (or perhaps more easily for the skeptic, picture Young picturing himself) among those in the heavenly council described by Abraham: Abraham is assigned to be the prophetic patriarch of innumerable posterity; Joseph Smith is called to restore Christ's church in the latter days; and, among the souls foreordained to artistic stewardships, La Monte Young is called to teach humanity, through music, about its eternal potential.

In fact, Young summarizes the eternal scope of his music using precisely the same language employed in Church meetings, media spots, missionary tracts, and lesson manuals to describe the broad scope of Mormon eternity. Says Young, "From the beginning of recorded time people have always wanted to understand their relationship with universal structure and to time—even in as simple a way as where do we come from, why are we here, and where are we going?" Though seemingly common thoughts, the three cosmic questions that constitute the composer's last turn of phrase stand out to the Mormon reader as unmistakable terminological remnants of Young's upbringing.[30] It is tempting, then, to look for connections operating at a deeper level than the rhetorical or terminological.

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historicity of this symbolism is highly questionable; the piece likely employed a predecessor to the equal tempered system.

30. Quoted in Toop, *Ocean of Sound,* 179. Compare it with this excerpt from the missionary discussions: "Knowledge of . . . the plan of salvation enables us to understand three basic questions about our existence: Where did I come from? Why am I here? Where am I going?" "Discussion 4: Eternal Progression,"

An Adobe Cabin at Salt Lake City

If you could hie to Kolob
In the twinkling of an eye,
And then continue onward
With that same speed to fly,
Do you think that you could ever,
Through all eternity,
Find out the generation
Where Gods began to be?[31]

While the Salt Lake Temple stands as the symbolic center of the city, the literal 0,0 of the original grid was marked with a small obelisk that for several decades was housed in another building, this one located a few yards southwest of the temple construction site. Erected in 1869 by the U.S. Coastal Survey to house the obelisk as well as instruments for making precise time measurements, it also served as the territory's first astronomical observatory; it was equipped with retractable roof slats and housed Apostle Orson Pratt's prized telescope. Pratt spent many late

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Uniform System for Teaching the Gospel (Salt Lake City: Corporation of the President of the Church of Jesus Christ of Latter-day Saints, 1986), p. 4–1. Coke Newell, *Latter Days: A Guided Tour through Six Billion Years of Mormonism* (New York: St. Martin's Press, 2000), xv, articulates the same three questions. Similar examples appear throughout Church curricula and media materials.

31. W. W. Phelps, "If You Could Hie to Kolob," *Hymns of the Church of Jesus Christ of Latter-day Saints* (Salt Lake City: Corporation of the President of the Church of Jesus Christ of Latter-day Saints, 1985), no. 284. Phelps, a close associate of Joseph Smith, was present when Smith recorded the cosmological account found in the Book of Abraham. One might even consider Phelps's hymn the first (and only?) American minimalist hymn text: The beginning of each line in the last two and a half of the hymn's five verses begins with the phrase "There is no end . . . ." This idea is articulated nicely in its current musical setting—Ralph Vaughn Williams's arrangement of the English tune "Kingsfold." The hymn begins in a minor key; but as it progresses, it continually hints at a forthcoming ending in major, which would sound much more conclusive. Each time the end of a verse nears, however, the harmony veers away from the finality or resolution of the implied major key and ends in the same minor key in which it began—a fitting musical embodiment of a cosmology in which there is no "end," but rather an "eternal round."

nights in the observatory, at the literal center of the Mormon world, documenting the movement of the stars and planets and especially looking for clues to the "Grand Key" described cryptically in one of Smith's revelations, which Pratt conceptualized as a universal "astrotheological" force or principle by which worlds are created and the cosmos is held together.[32] For a time, as Breck England has observed, this little cabin formed a curious and telling symmetry with another temporary building on Temple Square standing northwest of the temple site: the Endowment House, where early Mormons performed the highest covenants and ordinances of their faith while waiting for the temple proper to be completed. Pratt, whose enthusiasm for science and astronomy complemented his interest in genealogy and temple work (during a time in which many Saints had put off vicarious work until the temple had been completed), divided much of his devotional time on the square between the northwest and southeast cabins, alternately communing with the heavens in one and scanning them with his own eyes in the other. Strolling between the Endowment House and the observatory, gazing up through his telescope, Pratt was not just trying to "find God," he was trying to *find God.*

Erich Robert Paul observes that "Joseph Smith . . . [introduced] some novel ideas that directly contradicted the traditional Christian view of miracles, supernaturalism, and creationism. Specifically, [he] redefined the terms 'spirit,' which he interpreted as a 'material substance, only more refined,' and 'creation,' which, in his understanding, meant 'to organize from pre-existing materials,' rather than the emergence of something *ex*

32. Breck England, *The Life and Thought of Orson Pratt* (Salt Lake City: University of Utah Press, 1985), 247–51. England's account of Pratt's complementary genealogical and cosmological pursuits and his description of the symbolic architectural convergences represented by the uncompleted temple and its "annexes" brilliantly points up the resonance in early Mormonism between scientific inquiry and spiritual devotion. Breck relates Pratt's search for the "Grand Key" to Smith's explanations of Figure 2 of Facsimile No. 2, Abraham 3 in the Pearl of Great Price, from which Smith derived his vision of Abraham's cosmology. The Grand Key, Smith says, is "the governing power, which governs [several] planets or stars, as also . . . the Moon, the Earth, and the Sun in their annual revolutions."

nihilo."[33] Perhaps the most concise reflection of this redefinition is found in Abraham's cosmological vision, in which he is shown the workings of the universe—including the place in the heavens where God himself resides:

> And I saw the stars, that they were very great, and one of them was nearest unto the throne of God; and there were many great ones which were near unto it;
>
> And the Lord said unto me: These are the governing ones; and the name of the great one is Kolob, because it is near unto me, for I am the Lord thy God: I have set this one to govern all those which belong to that same order as that upon which thou standest. (Abr. 3:2–3)

This vision highlights a crucial aspect of Mormon theology: the idea that heaven is in some way a material rather than ethereal place, located somewhere and somehow within the same "order" as Earth. It follows from this that God, although immortal and perfected, is also in some way *embodied.* Joseph Smith's revelations asserted this doctrine explicitly:

> The idea that the Father and the Son dwell in a man's heart is an old sectarian notion and is false. . . .
>
> The Father has a body of flesh and bones as tangible as man's; the Son also. . . . (D&C 130:3, 22)

Before making his name as Mormonism's foremost amateur scientist, Orson Pratt had prolifically preached the embodied God of Mormonism in England; as he wrote in a tract distributed by the thousands, "A god without a body! A god without parts! . . . O, blush for modern Christianity!—a pious name for atheism!"[34] Mormon philosopher James Faulconer describes how this concept affects the Mormon worldview: "God is in the world in something like the same way we are; he is not resident in another

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33. Paul, *Science, Religion, and Mormon Cosmology,* 31.

34. Pratt, "The Kingdom of God," reprinted in *Orson Pratt's Works on the Doctrines of the Gospel* (Salt Lake City: Deseret News Press, 1945), 35–36. Pratt originally published it as a tract in Liverpool between 1848 and 1851. Here Pratt directly confronts the Presbyterian Confession of Faith, the Church of England creed, and other religious statements which describe God as a being "without body, parts, or passions." Other tracts distributed by Pratt during his missionary tenure included "Absurdities of Immaterialism; or, a Reply to T.W.P. Taylder's Pamphlet, Entitled, 'The Materialism of the Mormons or Latter-day Saints Examined and Exposed'" (1849) and "Great First Cause; or, the Self-Moving Forces of

ontological sphere. . . . His existence in the same ontological sphere that we inhabit makes impossible for Mormons the separation of the worldly and the heavenly."[35] For Mormons, it seems, faith is essentially a kind of cosmological pragmatism.

Erich Robert Paul observes that, because LDS cosmology conceives of spirit as just a more refined kind of matter and of heaven as just a more distant place, any scientific pursuit is also, on some level, a spiritual one—and vice versa; thus he observes in Mormons a combination of "great speculative powers as well as a penchant for things 'scientific.'"[36] Accordingly, a number of the prominent Church leaders and thinkers during the last century were scientists by profession before undertaking full-time Church service; and at least two studies have shown that, with respect to their proportion in the general population, Mormons are better represented among the scientific community than virtually any other religious sect in America.[37] Similarly, a disproportionate number of Mormons are published writers of science fiction. The adherents.com website, which tracks demographic and cultural trends within various religious communities, gives statistics on the religious affiliations of published science fiction and fantasy writers. Its list identifies, for example, seven Baptists, forty-seven Jews, thirty Catholics, and over 100 Mormons.[38] For both scientists and storytellers of the Mormon persuasion, the "celestial" in the astronomical sense accommodates the "celestial" in the theological

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the Universe" (1851). See Paul, *Science, Religion, and Mormon Cosmology,* 128–31.

35. James E. Faulconer, "Divine Embodiment and Transcendence: Propaedeutic Thoughts and Questions," *Element: An E-Journal of Mormon Philosophy and Theology* 1, no. 1 (n.d.), section 14, retrieved in November 2004 from http://www.nd.edu/~rpotter/element4.html.

36. Paul, *Science, Religion, and Mormon Cosmology,* 103.

37. Ibid., 7. Paul cites Kenneth R. Hardy, "Social Origins of American Scientists and Scholars," *Science,* August 9, 1974, 497–506. E. L. Thorndike, "The Production, Retention and Attraction of American Men of Science," *Science,* August 16, 1940, 137–41, had first documented the large number of Mormon scientists.

38. "Science Fiction/Fantasy Authors of Various Faiths," retrieved in October 2004 from http://www.adherents.com/lit/sf_other.html#lds. These statistics include only authors writing for a mainstream rather than religion-specific audience; a significant number of authors write science fiction directed to a specifically Mormon audience as well. It should be noted that while Mormons domi-

sense; heaven is not entirely metaphysical, and one's "heavenward journey" is not entirely metaphorical.

Perhaps this cosmological connection sheds some light on a curious moment in Ian Nagoski's interview of La Monte Young and Marian Zazeela. Their unanimity (and often simultaneity) of thought and utterance is legendary among those who know them; but in this instance, they seemed to encounter something of a conceptual disjunction. As Young reminisced about the kinds of spiritual thoughts he remembered having as a child, his wife of thirty years expressed surprise at the literalness with which he spoke of the idea of heaven:

> *Zazeela:* I never thought you actually meant Heaven. . . . I always thought you meant more of a sense of being transported to maybe an out-of-body experience or an ecstatic state, but not Heaven in the conventional, religious—
>
> *Young:* I think it's all interrelated, though. That if you can get into a transported, out-of-body, ecstatic state that that is part of it. That's a step towards it. In fact, the degree to which you can do it, that may actually be it.[39]

Young seems to suggest that the *heavenlike* state he seeks through complex vibrational periodicity can actually be a *heavenward* state—that his music, with its rigorous mathematical properties, seeks not merely to evoke the divine through musical symbols but to *embody* it through tangible acoustical manifestations. Young sees the harmonic series and the periodicities that derive from it as part of the ontologically constant "universal structure" to which God and mortals alike subscribe—and through the study of which the latter may approach the intelligence of the former.

Two circumstantial but nonetheless irresistible pieces of evidence suggest that Young is not alone among Mormons in projecting restorational concepts onto just intonation or in imbuing the harmonic series with a kind of archetypal, ontologically unifying significance. The

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nate in terms of number of authors, Catholics are more prolific, with 597 titles compared to 450 for Mormons, followed by 146 titles from Protestants. See also Kimberly Winston, "Fantastic Journeys: Mormon Authors Say Faith Informs Their Science Fiction," *Dallas Morning News,* October 21, 2000. Reprinted in beliefnet.com at http://beliefnet.com/story/55/story_5534_1.htm and retrieved in October 2002.

39. Young and Zazeela, interviewed by Nagoski, 25.

first of these is the curious acoustical and music-hermeneutical study undertaken by the French musicologist Albert Roustit. Though raised a Catholic, Roustit considered himself an atheist by the time he undertook graduate studies at the Sorbonne and the Paris Conservatory in the late 1960s. Renowned composer Olivier Messiaen, who taught a music theory course at the conservatory, reported that Roustit was the star of his class. Roustit accordingly assumed that a rather prestigious career in musicology awaited him upon the completion of his dissertation. His initial dissertation research acquainted him closely with Hermann Helmholtz's influential acoustical writings from the 1860s, which not only stimulated his interest as a scholar but also convinced Roustit of the existence of a divine designer of the universe. He subsequently assumed a fervent, personal, nondenominational Christian faith.

Roustit's acoustical study eventually developed into a complex and comprehensive theory that saw music as a God-given model for everything from the structure and movement of the solar system to the historical development, technological progress, and moral evolution of the human race. He even proposed this theory as a dissertation topic. When his committee at the Sorbonne rejected it, he published it independently in 1970 under the title *Prophétie Musicale dans l'Histoire de l'Humanité.*[40] The preface, penned by a perceptibly reluctant Messiaen, nonetheless warns those who read the words of his former pupil:

> The end of Time, the end of Space, the beginning of Eternity are all coming at us at express speed—and prior to that time there is to be the procession of terrors: the anti-Christ, the cataclysms, the deceptive triumph of the Beast of the Apocalypse.
>
> It is prudent to be prepared.
>
> That is what we read in each of the pages which follow. That is why I have written a preface for this book.[41]

Though his research and speculation had led him to renew his Christian faith, Roustit's all-encompassing theory of tones, history, and the cosmos was missing one important element. His mapping of cosmic, acoustical, and music-historical principles onto the history of humanity

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40. Albert Roustit, *Prophétie Musicale dans l'Histoire de l'Humanité* (Paris: Horvath, 1970). A self-published English translation by John A. Green appeared in 1975 under the title *Prophecy in Music: Prophetic Parallels in Music History.*

41. Roustit, *Prophecy in Music,* translated by Green, 14.

led him to conclude that there should have been some kind of enormous spiritual outpouring between 1798 and 1844, an outpouring that would mark the beginning of the last days spoken of in the Bible.[42] Shortly after publishing his book, Roustit encountered in a newspaper a reference to the Church of Jesus Christ of Latter-day Saints, or in French, *Saints des derniers jours*–"Saints of the last days." Upon contacting missionaries and hearing of Joseph Smith's revelations beginning in 1820 and his assassination in 1844, Roustit saw in Mormonism a belief system in which time, space, tones, heavenly bodies, and history could be integrated into the great, cosmic, immanent whole that he had already imagined. He was baptized a Mormon in 1971.[43]

The second piece of circumstantial evidence relates even more closely to Young's music: David Doty, James Tenney, and Ervin Wilson, three of the most prominent contributors to the modern body of just-intonational music and theory, all happen to be former or lapsed Mormons. Given the relatively small number of Mormon composers who have exercised substantial influence outside the Mormon community and the small number of composers who choose to write in alternate tuning systems, this coinci-

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42. I will not attempt to summarize how Roustit arrives at this interesting conclusion, except to say that he pinpoints certain important historical events and, using them as anchor points, maps important musical and scientific ratios (such as intervallic ratios of the harmonic series, the golden mean, etc.) onto history according to formulas derived from his interpretation of biblical prophecy. At the time of his book's publication and for lack of a better answer, Roustit accepted a friend's suggestion that the revelatory outpouring that took place between 1798 and 1844 was the formation of the British and Foreign Bible Society, which in 1804 undertook to translate the Christian scriptures into numerous foreign languages. Roustit was not satisfied with this answer, however, insisting that the spiritual outpouring indicated by his calculations must have included a restoration of the power to prophesy. It was for this reason that he so readily accepted the claims of Mormonism. See John A. Green, "Les Derniers Jours," *Ensign*, December 1974, 30.

43. I should make it clear that I find Roustit's book problematic with regard to issues both musicological and religious and mention it as a document of cultural history rather than an exemplar of ecclesiastically endorsed Mormon thought. I should also note that Roustit's studies never led him to explore issues of tuning; throughout the book, he considers equal temperament the "norm" from which the higher harmonics of the natural overtone series "deviate," rather than vice versa.

dence comprises an unusually large overlap of seemingly unrelated Venn-diagram circles.[44] Doty's family converted to Mormonism during his childhood, and he practiced the religion for several years before becoming inactive at age seventeen. He eventually cofounded the Just Intonation Network and has edited that organization's publication, *1/1*, since its inception in 1984; he is also the author of *The Just Intonation Primer* and an active composer of just-intonational music.[45] Tenney, a former Bell Laboratories researcher who now teaches composition at the California Institute of the Arts, is widely known for his groundbreaking work in acoustics, sound perception, and computer applications in music. He was born into a Mormon family in New Mexico.[46] Ervin Wilson is a central figure among current microtonalist composers and theorists, known both for his innovative tuning systems and the instruments he designs to realize them.

Wilson's background rivals Young's in terms of its rustic Western romanticism. He was born in 1928—in a covered wagon, no less—in one of the Mormon colonies in northern Mexico. He studied physics at Brigham Young University before turning his attention to music and moving to California, by which time he was no longer active as a Mormon. Wilson's service in the military during the U.S. occupation of Japan had piqued his interest in Eastern religions as well as Oriental tuning systems and musical philosophies, prompting him to explore spiritual traditions outside of Mormonism and experiment with a variety of tunings and tuning theories. He has since become an expert in Western and non-Western tunings,

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44. My thanks to composer Dan Wolf for initially informing me of Wilson's and Tenney's Mormon backgrounds and to Doty for informing me of his.

45. David Doty, *The Just Intonation Primer: An Introduction to the Theory and Practice of Just Intonation* (San Francisco: Just Intonation Network, 1994); and his recording, *Uncommon Practice: Selected Compositions, 1984–1995* (n.p.: Syntonic Records, 1999).

46. For some of his most important theoretical work, see Tenney, *META + HODOS: A Phenomenology of 20th-Century Musical Materials and an Approach to the Study of Form* (New Orleans: Inter-American Institute for Musical Research, Tulane University, 1964); and *A History of "Consonance" and "Dissonance"* (New York: Excelsior, 1988). Tenney has published a number of articles in musical and scientific journals and received an extensive tribute in *Perspectives of New Music* 25, nos. 1–2 (Winter/Summer 1987). An extended interview and a number of scores appear in *Musicworks* 27 (Spring 1984).

developing a number of his own dauntingly complex scales and scale-producing algorithms.[47]

While neither Tenney nor Doty has recognized publicly any connection between their music and their Mormon upbringing, Wilson insists that "I am, in fact, the product of Joseph Smith and Brigham Young"; likewise, while he no longer observes Mormon religious practices, he has retained a strong sense of Mormon cultural identity.[48] He also sees a symbiotic connection between his particular kind of musical pursuits and his two other great passions: agricultural genetics and genealogy. Indeed, one finds striking organizational–and visual–similarities between Wilson's pitch ratio diagrams, the Mendelian records he keeps for breeding special strains of plant species, and the pedigree charts on which he plots the generations of his Mormon ancestors.

A number of Mormon cultural traits thus seem to manifest themselves in the curious lapsed-Mormon-alternate-tuning phenomenon–or, to put it another way, these composers' attraction to some aspects of just intonation seems to be a redirection of certain latent Mormon cultural tendencies. In fact, in addition to the four lapsed Mormon just-intonationalists/microtonalists discussed here, Wilson told me that, when he recently mentioned his Mormon roots at a small conference of microtonal composers and theorists, other attendees indicated that they, too, came from Mormon backgrounds. In perusing the writings, works, and backgrounds of the composers mentioned here, one senses a strong spiritual current; and the rigorous methodologies they employed to reach their spiritual or transcendent ends certainly demonstrate the general "penchant for things 'scientific'" described by Erich Robert Paul. One might speculate that by approaching musical composition at the level of raw acoustical materials and attributing to those materials *literal* rather

47. Some can be found in Wilson's numerous contributions to *1/1*, as well as the esoteric tuning journal *Xenharmonikon*. Much of his work is available in his online archive, http://anaphoria.com. Most recently, Australian composer Warren Burt has composed a series of pieces, collectively titled *The Mossy Slopes of Mt. Meru*, using scales derived from Wilson's theoretical work.

48. For his own enjoyment, and that of the Mormon missionaries who visit him on occasion, Wilson has rendered some of his favorite Mormon hymns and Primary songs in alternate tunings. According to Wilson, "Mormon hymns in just intonation are quite inspiring." Ervin Wilson, telephone conversation with Grimshaw, January 9, 2002.

than merely *evocative* power, these composers share an underlying assumption that those material actions are not merely mediated through symbolic interpretation but rather that they actually function in a literal or causal way to initiate some kind of spiritual enhancement. A rough parallel could thus be drawn between the Mormon idea of spirit as refined matter and the just-intonationalist idea of spiritual music as refined acoustics. At the very least, in considering this group of composers, one can read in Mormon terms David Claman's observation that "there is often a strong ideological bent to composers using just intonation. They will commonly contrast equal-tempered tuning with just intonation using conceptual pairings such as false/true, artificial/natural, corrupt/pure, and beautiful/ugly."[49] In the case of Young and his ex-Mormon cohorts, we would only have to amend Claman's list of polarities to include "apostasy/restoration."

The Well-Tuned Piano as Mormon Cosmology

If just intonation is to Young what religious restoration was to Joseph Smith, *The Well-Tuned Piano* is Young's Book of Abraham—or, to borrow once again from Terry Riley's introductory encomium, "a cosmic overview of life's tragedy."[50] Young began the work in 1964 as a forty-minute improvisation played on an old upright piano tuned to a special just tuning. Over subsequent decades, he continued to expand it. A recording of a 1981 performance lasts about five hours, and the recently released DVD of a 1987 performance runs nearly six and a half. The work also grew in breadth: Young eventually acquired a custom Bösendorfer Imperial Grand piano, a model unique for its expanded lower range—into which the composer eventually extended the range of the music.

The copious liner notes to the 1981 recording of *The Well-Tuned Piano* contain a detailed, moment-by-moment "synopsis" of the work, which travels an improvised path through a predetermined series of chordal and motivic areas. These chords and motives are given fanciful and evocative titles, such as "The Theme from the Dawn of Eternal Time" and "The Interlude of the Wind and the Waves," and the reiterations and recombinations of these elements are documented in great detail through reiterations and combinations of the images associated with each element

49. Claman, *Western Composers and India's Music*, 241.
50. Riley, liner notes to *The Well-Tuned Piano*, 2.

present in the music at a given moment. This quasi-narrative serves as a framework for Young's improvisatory exploration of the piece's unique tuning system, which remained a secret until Kyle Gann "cracked" it in 1993 and subsequently offered an analysis of the work.[51]

In assessing the formal aspects of the piece and its tuning system, Gann proposes two parallel readings of *The Well-Tuned Piano:* He calls one "Western," having to do with the multiple thematic and harmonic areas that Young develops and combines over the course of the work along a linear, forward-moving trajectory that unfolds bit by bit over time; the other reading is "Eastern," which Gann describes as "a timeless . . . static articulation of a set tuning, a continuous present in which concepts of before and after are irrelevant."[52] Gann surely recognizes the artificiality of this dichotomy and, aware of the stereotypes already in circulation, employs it for expositorial efficiency rather than descriptive nuance. Even if such stereotypes are invoked self-consciously, however, they convey misleading ideas. Indeed, Allison Clare Welch and David Claman both demonstrate ways in which the "teleological" aspects of the piece are connected with Eastern musical performance practices as much as with Western.[53] Perhaps, then, the association of the "timeless . . . static articulation of a set tuning" with Eastern spirituality deserves some reevaluation as well.

Young emphasizes, in his liner notes to the recording of the work, a special aspect of the just intonation system used in the *Well-Tuned Piano:* All the pitches used are found within the overtone series of a theoretical subsonic E-flat that falls eleven octaves below the lowest E-flat on a standard piano (or ten octaves below the bottom end of Young's Bösendorfer).[54] Every pitch, then, is a whole-number multiple of the fundamental, and any combination of pitches within the tuning system comprises an interval that can be expressed by a periodic, whole-number ratio. From

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51. Kyle Gann, "La Monte Young's *The Well-Tuned Piano,*" *Perspectives of New Music* 31, no. 1 (Winter 1993): 135–63.

52. Ibid., 149.

53. Welch, "The Influence of Hindustani Music," 367–71; Claman, "Western Composers and Indian Music," 259–65.

54. In this regard, *The Well-Tuned Piano* finds a curious corollary in several works by one of Young's ex-Mormon colleagues. In James Tenney's *Saxony* (1988), for example, a saxophonist used a digital-delay system to record and play back the performer's sounds at specified intervals while the performer continued to play new sounds. The delay system operates in a loop, so that layers upon layers of

the listener's perspective, this means that every chord is acoustically in tune with itself in a way that cannot be attained in 12TET.[55] From a cosmological perspective, the tuning is an elaborate embodiment of "universal structure"—an approach to music that seeks to reconcile "harmony" in the traditional, musical sense and "harmony" in the ancient, astronomical sense by making notes and tones resonate together in the same kind of regular periodic cycles that heavenly bodies do.

The concept of the theoretic fundamental tone receives so much emphasis and is so engaging that, in his contribution to the only book-length treatment of Young's work, John Schaeffer claims to perceive emerging from *The Well-Tuned Piano*'s "keyboard filigrees and shimmering harmonics . . . a strongly implied drone, although since it's several octaves below the range of the piano, it's never actually heard."[56] Schaeffer is, of course, hyperbolizing or mythologizing, since the frequency of the fundamental E-flat is about 0.018 Hz, or a decidedly subsonic 56 seconds per cycle. Nonetheless, the idea of hearing a mysterious, subsonic fundamental is a poignant metaphor for sensing the audible periodicity between pitches—a quality that the existence of such a generative fundamental facilitates.

Furthermore, Schaeffer's fanciful claim actually has some *remote* basis in science. Psychoacoustician John Molino compares La Monte Young's use of psychoacoustical principles to the approach early impressionist painters took, combining patches of paint in such a way that certain colors would appear to the eye even though they existed nowhere

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sound accrue as the performer continues to improvise within certain parameters. The notes available for improvisation all fall within the harmonic series of a single fundamental, which also happens to be an E flat. Tenney has composed a number of other overtone-based pieces, including *Spectral CANON for CONLON Nancarrow* (1974) and *Voice(s)* (1984).

55. To be sure, first-time listeners would likely assume the opposite; because most people are quite accustomed to the acoustic concessions of equal temperament, they usually associate the added resonance or acoustical clarity of just intonation with being out of tune.

56. John Schaeffer, "Who Is La Monte Young?" in *Sound and Light: La Monte Young and Marian Zazeela,* edited by William Duckworth and Richard Fleming (Lewisburg, Pa.: Bucknell University Press, 1996), 28. This book is volume 40, no. 1, of *The Bucknell Review.*

on the canvas.[57] Molino finds the same quality in the way *The Well-Tuned Piano* combines periodic pitches so as to induce the listener to hear unarticulated frequencies. Many of the thematic areas within which Young improvises are designated as "cloud" sections, meaning that, when Young arrives at them, he develops rapid figuration patterns on the keyboard that result in "clouds" of sounds of the kind Molino describes. From these clouds emerges a variety of distinct pitches and resonances not accounted for in an inventory of the notes actually being struck.[58] Some of these sounds are "combination" or "difference" tones, which are strictly acoustical phenomena. To put it simply, these extra sounds are produced when periodic vibrations combine "in the air," as it were; they register in the cochlear fluids and appear as part of the pitch spectra when the recorded signal is subjected to computer analysis.

Molino is more fascinated, however, by the way in which Young achieves the purely *psycho*acoustical phenomenon known as the "virtual fundamental." It occurs when a fundamental tone is inferred from the presence of some of its overtones, even when the fundamental itself is physically absent from the vibrations of the ear mechanism. The brain senses periodicity between received pitches that are accounted for on the basilar membrane and in the cochlear fluid; it then psychologically supplies the fundamental pitch corresponding to that periodicity. For example, if one generates the fifth, sixth, and seventh overtones of a 200 Hz fundamental while omitting the 200 Hz signal itself, the brain will infer the absent fundamental and one will hear a 200 Hz tone nonetheless.[59]

Of course, even though Young provides us with a keyboard full of harmonics that do, in fact, result in virtual resonances and other striking

57. Quoted in Young, "Notes on *The Well-Tuned Piano*," 7.

58. Gann, "*The Well-Tuned Piano*," 149, for example, reports hearing "foghorns, voices, bells, even machinery" in these passages.

59. J. Pierce, "Introduction to Pitch Perception," in *Music, Cognition, and Computerized Sound: An Introduction to Psychoacoustics*, edited by Perry R. Cook (Cambridge, Mass.: MIT Press, 1999), 58-64. James Pritchett, liner notes to Ulrich Krieger, *Walls of Sound* (00 Discs 0032, 1997), observes this same phenomenon in Tenney's *Saxony*, as the generative fundamental of that piece is within the range of hearing: "The last fundamental–the really low one–isn't even sounding; it's below the range of the instrument. But as the saxophonist adds one overtone

acoustical phenomena, we are incapable of "hearing," in any literal sense of the word, a fundamental quite so "virtual" as 0.018 Hz. Young himself doesn't make any claims about hearing an E-flat that low, but he does seem intent on blurring the boundaries of the hearable and stretching our ears (and brains) further into the lower range than they usually venture. As the work approaches the two-hour mark, Young presents a variation on the "Theme of the Dawn of Eternal Time" above successively lower E-flat bass tones which he identifies as "Pools." At 1:36:51 the theme appears in "The Deep Pool"; at 1:46:11 it appears in "The Deeper Pool"; and finally at 1:56:33 it descends to "The Deepest Pool." At this point, Young presents for the first time the lowest E-flat on his custom-built Bösendorfer. The appearance of the note has a startling effect. At about 18.4 Hz, it challenges the limits of the ear's low-frequency range, which, as a rule for humans is 20 Hz. Our ears and brains struggle to make sense of the noise and, in so doing, take us into that gray area where the tuning fork transforms into the metronome and perceptible pitches become pure numbers. Although in isolation the low E-flat would likely be an absolute enigma, perhaps heard as an indiscernibly fast pulse rather than an indiscernibly low pitch, the harmonic context allows us to hear it as an E-flat and place it within the harmonic scheme of the system. This nearly inaudible pitch, now made comprehensible, serves as a stand-in for the completely inaudible one from which it and the rest of the pitches in the piece are derived.

Young seeks thereby to traverse the border between heard and unheard periodicities, thus bridging a polarity that he describes in Vedic terms: the *ahata nada,* or "struck" sound—music of the air—becomes the *anahata nada,* or "unstruck" sound, the music of the ether. In this regard Young is fond of quoting Orientalist scholar and musician Alain Danielou, who compares the *anahata nada* to "what neo-Pythagoreans called 'music of the spheres.' It forms numerical patterns which are the basis of the world's existence . . . In this unstruck sound the Gods delight.

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to another (via the delay system), this low phantom sum appears, like a mirage." Pritchett continues: "The fundamental: the primary frequency of tone, the one underlying the overtones, the frequency to which all other tones relate . . . A strong fundamental persists even when all we hear are overtones. In fact, if the overtones are there, our mind (or is it our soul?) will provide the fundamental for us."

The Yogis, the Great Spirits, projecting their minds by an effort of the mind into this unstruck sound, depart, attaining Liberation."[60] This description seems to capture perfectly Young's heavenly quest: the attainment of metaphysical transcendence through the minutely calculated control of the physical medium of sound.

And here again, Young's Eastern allusion finds a corollary much closer to home. The harmonic structure articulated by *The Well-Tuned Piano* finds elegant resonance not only with the Vedic *anahata nada*, but likewise with the grand vision of the universe shown us by Mormonism's Abraham. In that vision, Abraham learns that all heavenly bodies follow a strict hierarchical principle: the movement of stars and planets is governed in some way by the star nearest to the planet upon which God himself resides.

> And I saw the stars, that they were very great, and one of them was nearest unto the throne of God. . . .
>
> And the Lord said unto me: These are the governing ones; and the name of the great one is Kolob . . . ; I have set this one to govern all those which belong to the same order as that upon which thou standest. (Abr. 3:2–3)

From Kolob's motion extends another, related hierarchy, that of time:

> And where these two facts exist, there shall be another fact above them, that is, there shall be another planet whose reckoning of time shall be longer still;
>
> And thus there shall be the reckoning of time of one planet above another, until thou come nigh unto Kolob, which Kolob is after the reckoning of the Lord's time. (Abr. 3:8–9)

Both the astronomical fundamentality of God's dwelling and the time-scale it articulates speak to God's fundamental position in the hierarchy of sentient entities: "And the Lord said unto me: These two facts do exist, that there are two spirits, one being more intelligent than the other; there shall be another more intelligent than they; I am the Lord thy God, I am more intelligent than they all" (Abr. 3:19).

These organizations of time, space, and intelligence all outline a general operative law of the universe: If there are two "facts" of a given or-

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60. Quoted in Young, telephone conversation with Grimshaw, December 20, 2001, and on other occasions. See Alain Danielou, *The Ragas of North Indian Music* (London: Barrie and Rockliff, 1968), 21.

der, and if one is "above" or "greater" than the other, they imply the existence of a hierarchy that continues level by level until arriving at its origin. In the case of heavenly bodies, all stars are governed by Kolob; for reckonings of time, the fundamental measurement is according to the periodicity of Kolob's motion; within the hierarchy of intelligences, God is the most intelligent.

One hardly has to resort to metaphor to map overtone-based tuning onto this hierarchical system. The periodicity of the heavenly star Kolob as it rotates on its axis serves as a kind of fundamental tone, with all the other heavenly bodies moving in ordered, hierarchical harmony, like Kolob's overtones. As both Abraham and the psalmist tell us, a thousand years for man is a single day for God; thus, in both the Vedic and the Mormon cosmos, spiritual attunement is associated with one's ability to perceive elongated periodicities—to "hear," as it were, the music of the universe, despite its ineffably low frequency.[61]

If we allow ourselves free traversal of the subsonic envelope (a traversal that Young attempts to facilitate, or at least give precedent for, with the supposedly subsonic E-flat at the bottom of his keyboard), tones become sheer periodicities; and just as the periodicities of multiple heavenly bodies suggest the hierarchy of Kolob, so the periodicity of two just-tuned pitches suggests the hierarchy within which those pitches exist (and, in some circumstances, produces the fundamental tone of that hierarchy). To paraphrase: "*If two pitches exist,* and there be one below the other, there shall be lower pitches below them; therefore, the fundamental is the lowest of all the pitches. . . . *These two facts do exist,* that there are two pitches, one being lower than the other; there shall be another lower than they; the E flat is the fundamental, and is lower than they all."[62]

The pitches qualify as "facts" only when tuned rationally; because

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61. This idea suggests a vaguely Mormon aspect to one of Young's most eccentric personal habits. Convinced that their natural rhythms align with a period not based on Earth's rotation, Young and Zazeela rise and retire according to an elongated 33.6-hour day, five of which equal the 168 hours of the more conventional week. They seem undeterred by the many practical inconveniences posed by their deviation from the usual seven-day, twenty-four-hour cycle.

62. By using "period" instead of "frequency," I could have retained the qualifiers "higher" and "greater" from the original texts, since period (taken to

equal-tempered intervals are derived from irrational numbers, their constituent frequencies are literally not "facts" at all, but numerical approximations. Every interval in *The Well-Tuned Piano,* on the other hand, results from the combination of acoustical "facts." These "facts" become art, Terry Riley again tells us, as they "carry us . . . ever upwards into a jet stream of pure love."[63]

Residing in the realm of the subsonic, La Monte Young's low E flat is hidden in much the same way that God remains veiled, Earth time remains fixed, and Kolob remains distant. By articulating, over the course of several hours, *The Well-Tuned Piano*'s tuning system, Young aspires to be a conduit to the celestial realm. He seeks to close the distance, rend the veil, and allow us to hear, through spiritual ears, the unhearable fundamental tone of the universe: "The Muse appears! The tones of *The Well-Tuned Piano* suspend in the air—illuminated before me as if emanating from the Universal Source of the Eternal Sound—OM."[64]

A prophet uttering a solemn prayer to a divine light suspended in the air above him: This image is unavoidably familiar to the Mormon reader. Indeed, it is not difficult to reconcile Young's spiritual evocations of the ancient East with religious ideas from the relatively recent West. When La Monte Young says "OM," we might listen for echoes of "amen." When La Monte Young says "universal structure," we might well read "structure of the universe"—and specifically, the universe of

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mean the amount of time taken to complete a single cycle) is the inverse of frequency. It seemed simpler, however, to simply realign the orientation of the hierarchical flow.

63. Riley, liner notes to *The Well-Tuned Piano,* 2. Pritchett, liner notes, *Walls of Sound,* not paginated, arrives at a similar conclusion regarding Tenney's *Saxony*: "Everything . . . in it comes from this one fact: that fundamentals produce overtones in fixed proportions. Much of James Tenney's music has this quality of *fact* about it. . . . The last fundamental . . . [is] an illusion produced from truth, from fact; it is the transcendent beauty of mathematics made physical." Larry Polansky, "The Early Works of James Tenney," *Soundings* 13 (1984): 225, expresses similar sentiments about another of Tenney's overtone-series pieces, *Spectral CANON for CONLON Nancarrow* (1974): "Nothing I could say . . . could ever substitute for the pure joy of listening to this marvel, which is heard once again more as a fact of nature than as a composed piece."

64. Young, liner notes, *The Well-Tuned Piano,* inside cover preceding first numbered page.

Mormon cosmology. When Young says he wants to carry us away to Heaven, perhaps it means that he wants to carry us away to Kolob.