

The Sonic Search For Kolob: Mormon Cosmology and the Music of La Monte Young

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1. ORIENTATION: A VISIT TO GILGAL GARDEN

BRIGHAM Young, second president of the Church of Jesus Christ of Latter-day Saints, laid out the streets of Salt Lake City in a grid, navigable by simple X and Y coordinates (with 0,0 at the Salt Lake Temple), such that even a newcomer to the city should have no trouble finding the intersection of 700 East and 500 South. From there one walks half a block east and enters through the inconspicuous gate on the north side of the street, proceeding down a long path into what was once the back yard of Thomas B. Child. 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)

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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 likeness of Joseph Smith, Jr., its chest ornamented with the constellation Ursa Major (Figure 1). Proceeding past the Sphinx, one comes across the scattered anatomy from Nebuchadnezzar's dream, and, circling to the right, an arch of stones crowned with the symbols of Alpha and Omega. Further, nearly completing a loop of the garden, one crosses intersecting paths made of broad flat stones, each engraved with unreferenced scriptures, uncited hymn verses, and unattributed quotes, such as:

omissions, and recognizing that the sincerity of my thanks does not necessarily reflect or imply the extent of their endorsement, I nonetheless wish to acknowledge Daniel

Albright, David Claman, David Cook, Michelle Green, Gabriela Initchi (whose seminar on music and cosmology provided the first forum for this research), Ralph Locke, Paul Miller, Alan Pierson, Chris Rice, Martin Scherzinger, Lane

Twitchell, Dan Wolf, and Dennis Young (La Monte Young's father) for their various contributions to this project; Ervin Wilson and David Doty, for graciously sharing their time and thoughts; Patrick Finerty, Jr. and H. Michael Marquardt, for granting permission to use their photographs; Kristen, for reading innumerable drafts and providing invaluable support, editorial and otherwise; and, of course, La Monte Young and Marian Zazecla, who have been

overwhelmingly generous in discussing this topic with me and supporting the research behind this project, and have proven to me that the intersection of biography and interpretation is no less intriguing when the artist is available for consultation.

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

1. Though Bishop Child avoided divulging his sources, I'll provide them here, in respective order: John Hay, in an 1891 letter to Henry Adams, on the bronze statue marking the grave of Adams's wife Marian; God speaking to Moses, in the Book of

Moses 1:39, from the volume of Mormon canonical scripture known as *The Pearl of Great Price*; art historian Kenneth Clark, in *Landscape Into Art* (London: J. Murray, 1949).



Figure 1. The Joseph Smith Sphinx in Thomas B. Child's Gilgal Garden (photo courtesy of Patrick Finerty, Jr.)

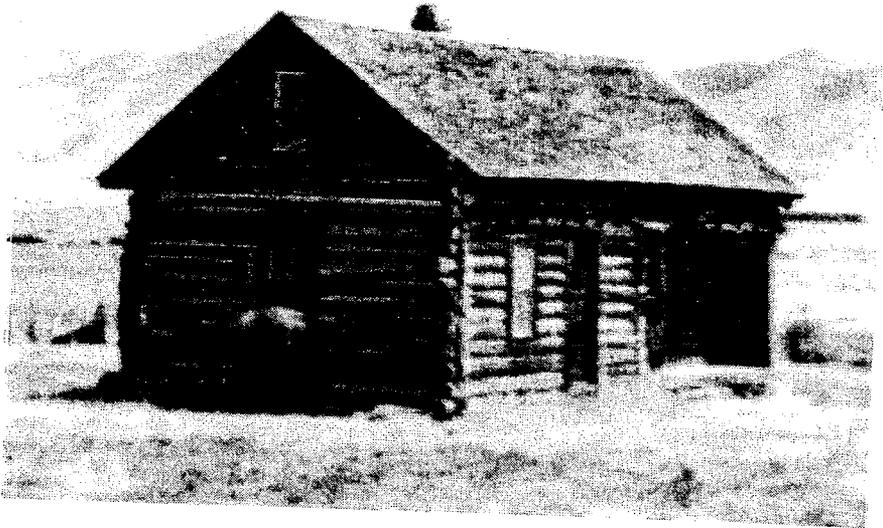
2. LOG CABIN #2: BERN, IDAHO

EXITING the garden, one takes 5th South west to the Interstate, then on to Highway 89 North, eventually crossing the state border 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 (Figure 2). 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. "[A]s 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 a particularly musical electrical pole in nearby Montpelier. The appeal is obvious: such sounds resonate—both figuratively, and, in some cases, quite literally—with the kind of compositions for which La Monte Young has since become famous. His *Composition 1960 #7*, for example, simply provides the performer with a B and an F#, which are "[t]o be held for a long time."³ His *Trio for Strings* (1958), recognized by one author as "the virtual foun-

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

3. A performance of the piece on 20 June 2001 in New York City, given under the composer's supervision and attended by the author, lasted about 85 minutes.



**Figure 2. The
Young family's
log cabin in Bern,
Idaho (photo by
Jeremy Grimshaw)**

tainhead of 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 the pitches that Young recalled hearing as a boy when he stood at the bottom of that particular power pole in Montpelier.

Virtually all of Young's compositions, in their explorations of long tones and sustained harmonies, defy normal conceptions of teleology and temporality. "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 posterity?"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 biography, 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 1987 record-

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

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

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

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

ing 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 60s. Indeed, 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 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 "West" would imply.⁹ Likewise, although the spiritual and transcendent qualities attributed to Young's music are frequently described (by the composer and others) using exotic terminology, the beginning of Young's heavenly quest far predates and dovetails with his exposure to Eastern religious ideas and 60s counter-cultural aesthetics. Writers on early minimalism have yet to give due consideration to certain spiritual

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

9. While the research of each of these scholars takes a valuably detailed look at the connections between Young's work and his interest in Eastern thought, Claman undertakes a 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. dissertation (Princeton University, 2001), chapters 2 and 4; and Allison Clare Welch, *The Influence of Hindustani Music on Selected Works of Philip Glass, Terry Riley and La Monte Young*, Ph.D. dissertation (University of Texas at Austin, 1997), chapters 3 and 4. See also Welch, "Meetings along the Edge: Svāra and Tāla in American Minimal Music," *American Music* 17, no. 2 (1999): 179-99.

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 his early adulthood, Young retained certain conceptual paradigms from Mormonism even after abandoning most Mormon religious practices; these paradigms would reappear in various terminological adaptations and spiritual contexts throughout his career.¹⁰ Below I offer an examination of Young's music that will seek to problematize common generalizations regarding his musical and philosophical influences by considering his work within the context of Mormon thought. In doing so, I do not mean simply to replace one ordinary myth 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 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 plan to get us there?

10. Though not a practicing Mormon, Young consciously maintains something of a Mormon identity. In an interview I conducted in preparation for this study, 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 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. La Monte Young and Marian Zazeela, interview by the author, New York City, 4 March 2001.

3. 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 PM to midnight, filled with the aroma of 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 down 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 60s 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, himself a composer interested in complex tuning theories, handily and enthusiastically provided information about the mathematical 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, and the acoustical and psychoacoustical means by which those properties are embodied and conveyed to the senses and the mind.

Since the early 1960s Young has championed just intonation with "near-evangelical zeal," as Claman describes it,¹³ and 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—that is, intervals that occur naturally in the harmonic series and can be expressed by whole number ratios.¹⁴ The per-

11. For a brief explanation of the title of the work, see Kyle Gann, "The Tingle of $p \times m^n - 1$," *The Village Voice*, 4 October 1994. Accessed at Young's website <<http://melafoundation.org/gann.htm>>.

12. Kyle Gann clearly expresses the former of these two 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." See Gann, "The Tingle of $p \times m^n - 1$."

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

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

fect fifth, to take a convenient example, can be expressed as the frequency ratio between the third harmonic and the second, or $3/2$; that is, for every three wave cycles of the higher pitch, the lower pitch will repeat exactly two wave cycles.¹⁵ In the equal temperament system, however, the ratios are altered from their natural harmonic occurrences in order to allow for equal relative intervallic qualities across different keys (so that a certain interval in one key maintains its quality when transposed to another). This is accomplished by employing the following method to divide the octave into twelve equal semitones:

$$1 \text{ semitone} = 2^{1/12} = 1.05946\dots$$

This means that the ratio between pitches a semitone apart in this system will be $1.05946\dots/1$, the numerator extending for an infinite number of decimal places (which makes it technically not a ratio at all, since it does not express a rational value).¹⁶ A perfect fifth in the equal temperament system can be calculated using the same method, modified to reflect the seven half steps contained in that interval:

$$\text{perfect fifth} = 2^{7/12} = 1.4983\dots$$

That is, in an equal temperament fifth, the frequency of the higher pitch is $1.4983\dots$ times that of the lower pitch. The sonic discrepancy between an equal temperament fifth and a just fifth can thus be thought of mathematically as the difference between 1.5 (or $3/2$) and $1.4983\dots$ (see Figure 3). The discrepancies for other ratios can be found in the same way. For example, a just minor third can be created by the ratio of $6/5$, which equals 1.2 ; the equal temperament minor

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

16. This can be conceptualized by thinking of the octave frequency ratio of $1:2$ 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 3a. Frequency ratio between pitches a semitone apart in the equal-tempered scale.

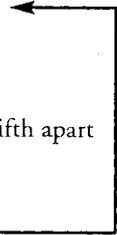
$$1 \text{ semitone} = 2^{1/12} = 1.05946\dots$$

Figure 3b. Frequency ratio between pitches a perfect fifth apart in the equal-tempered scale. The “7” in “ $2^{7/12}$ ” refers to the seven half steps in a perfect fifth.

$$\text{perfect fifth} = 2^{7/12} = 1.4983\dots$$

Figure 3c. Frequency ratio between pitches a perfect fifth apart in just intonation.

$$\text{perfect fifth} = 3/2 = 1.5$$



third is a little smaller, the frequency of the higher pitch being only 1.1892... times that of the lower pitch.

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. The relationship of periodic composites to the natural harmonic series can actually be made audible: returning to the example of the perfect fifth, an interval tuned to the ratio of $3/2$ can result in the creation or perception of a third pitch, an octave below the lower of the two (as shown in Figure 4). On the other hand, when an irrational tuning is used, the waveforms never align and the composite thus exhibits no periodicity (as shown in Figure 5).

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.¹⁷ 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

17. La Monte 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 specifically. 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.

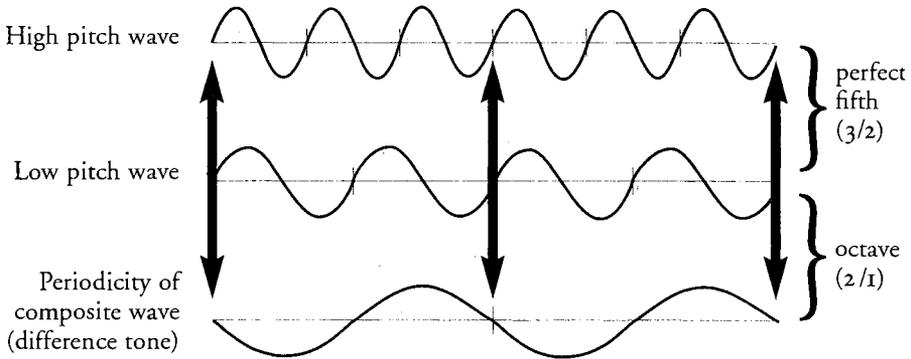


Figure 4. Periodicity of the composite waveform of a perfect fifth tuned according to the just ratio of $3/2$. The high pitch completes 3 cycles for each 2 cycles of the low pitch. The composite wave form exhibits periodicity as the perfect $3/2$ alignment continues, causing the ear to perceive a third frequency one octave below the lower of the two sounded pitches.

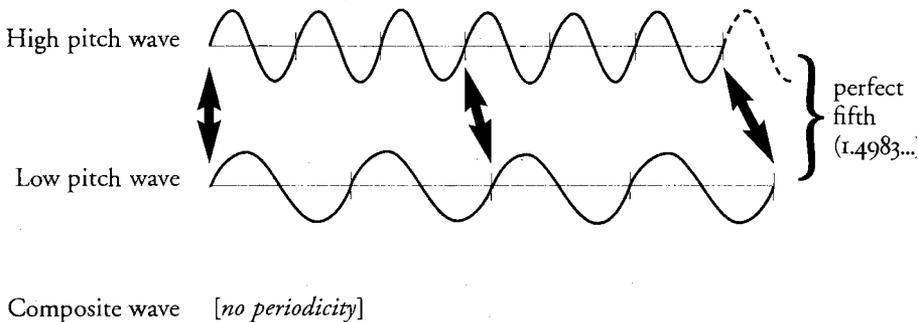


Figure 5. Representation of wave forms of an equal-tempered perfect fifth, tuned according to the ratio of $1.4983.../1$ (not quite $3/2$). The high pitch completes just under 3 cycles for each 2 cycles of the low pitch. (The misalignment is exaggerated here for illustrative purposes.) Thus, the composite waveform is not periodic.

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."¹⁸ 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 equal temperament, 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."¹⁹

Comprising up to six 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."²⁰ Young also sees himself as a kind of musical prophet and speaks matter-of-factly of his divine mission. "[I had] a calling to become what I became...I was created to do this."²¹ He insists that by studying his music, "the soul becomes capable of developing to a higher state of evolution."²² 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

18. Young, "Notes on *The Well-Tuned Piano*," 7.

19. Ramon Pelinski, "Upon Hearing a Performance of *The Well-Tuned Piano* [Part 1]," interview with La Monte Young and Marian Zazeela, *Interval: Exploring the Sonic Spectrum* 4, no. 3 (1984): 18.

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

21. La Monte Young and Marian Zazeela, interview by Ian Nagoski, 39.

22. *Ibid.*, 25.

come to Earth to study music so that it could have a better understanding of universal structure.”²³ In sum, Young sees himself as a divinely appointed, predestined restorer and refiner of ancient knowledge with special access to 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 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 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—and with some authority—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

23. Quoted in David Toop, *Ocean of Sound: Aether Talk, Ambient Sound, and Imaginary Worlds* (London and New York: Serpent’s Tail, 1995), 177-78.

rhetoric—and, as we shall see, his compositional practices—fit quite comfortably within certain Mormon contexts. In fact, during an interview conducted in preparation for this study, the composer stated outright that his later spiritual developments were erected atop the conceptual foundation of his Mormon upbringing.

There's no question in my 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.²⁴

Young then proceeded to draw 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,” s/he utters virtually the same sentiment as the Hindu who says “OM, Nama Narayana”: Nama, *in the name of*; Narayana, another name for Vishnu; OM, the sacred syllable, a gesture of attunement.²⁵

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 brief summary of some of these principles as they appear in Mormon doctrine and history will provide a context in which to reassess the nature of Young's compositional philosophies.

24. La Monte Young and Marian Zazeela, interview by the author.

25. *Ibid.*

4. LOG CABIN #1: PALMYRA, NY

FROM Rochester, NY, 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 that surround the intersection in the middle of town, and turning right on Temple Road, one eventually encounters another tiny log cabin (Figure 6). It is a replica of the one that stood on the same spot in 1820 when Joseph Smith Jr., then fourteen years old, received the first of several divine visitations. Confused by the doctrinal discrepancies between the various preachers and revivalists seeking to enlarge their flocks, Joseph retired to the woods behind the cabin one morning to inquire of God directly. His description of the subsequent events is one of the most oft-recited passages in Mormon scripture:

I saw a pillar of light exactly over my head, above the brightness of the sun, which descended gradually until it fell upon me.... When the light rested upon me I saw two Personages, whose brightness and glory defy all description, standing above me in the air. One of them spake unto me, calling me by name and said, pointing to the other—*This is My Beloved Son. Hear Him!*²⁶

The second messenger then proceeded to tell 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.... [T]hey teach for doctrines the commandments of men, having a form of godliness, but they deny the power thereof.”²⁷ They told Joseph that certain fundamental truths had been lost during centuries of doctrinal apostasy, and that he had

26. Joseph Smith, *History* 1:16-17. This is part of a portion of Smith's history included as scripture in *The Pearl of Great Price*.

27. Joseph Smith, *History* 1:19.



Figure 6.
Reconstruction of
the Smith family's
log cabin in
Palmyra, NY
(photo courtesy of H.
Michael Marquardt)

been chosen to initiate the restoration of those truths to the Earth.

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 scientific historian Erich Robert Paul 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."²⁸ Many aspects of this "universal vision" are encountered in the Book of Abraham, an extra-biblical, first-person account of the ancient patriarch's ministry, which Joseph Smith received through some type of oracular transmission and which Mormons include in their scriptural canon. In the Book of Abraham, God shows the eponymous prophet a vision of humankind in their pre-earth, spiritual state, and reveals that these spirits have already demonstrated certain aptitudes and qualities of obedience and intelligence. God, the father of all the spirits and the most intelligent of all, assembles his children in a great council before sending them to Earth. In this council, a number of the spirits are chosen to fulfill particular Earthly stewardships.

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

29. Abraham 3:23, included in *The Pearl of Great Price*. See also *Doctrine and Covenants* 138:53-56; this book, a collection of revelations recorded by Joseph Smith and subsequent church leaders, is also considered scripture by Mormons.

Now the Lord had shown unto me, Abraham, the intelligences that were organized before the world was...and he said: These I will make my rulers; for he stood among those that were spirits, and he saw that they were good; and he said unto me: Abraham, thou art one of them; thou wast chosen before thou wast born.²⁹

Abraham's vision of the "preexistence" exemplifies a central tenet of Mormon religion and culture: the concept that each human had a distinct pre-Earth identity and certain acquired skills or talents that qualified her/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 man's post-Earth state. According to Mormon scripture, those who attain the highest level of heaven, or *celestial kingdom*, enjoy *eternal life*—a term that has very specialized meaning for adherents: while immortality simply suggests living forever, *eternal life* couples unending duration with an infinite accumulation of knowledge, an *eternal progression*, in which one gradually and asymptotically approaches the intelligence and power of Deity. Preparation for this lofty goal is the design of earthly existence since, according to 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."³⁰ 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."³¹

Considered in a Mormon context, Young's

30. *Doctrine and Covenants* 130:18-19.

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

discourse assumes a clearly Mormon timbre. The title alone of his most important work, *The Well-Tuned Piano*, articulates a strong restorational tone, defiantly confronting the spiritually compromised tuning systems that J.S. Bach's *Well-Tempered Clavier* has come to symbolize (albeit somewhat erroneously).³² Young's latter-day answer to Bach seeks to reestablish communication with Deity via long-dormant lines of transmission, lines which can only be reactivated by a tuning system acoustically pure enough to resonate with the universe itself. We might well recall at this point Young's statement about equal temperament *reminding* him of the truth and music in just intonation *being* the truth, and compare it to Jesus's words to Joseph Smith in the grove—about how the 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 seen by Abraham and described in church scripture: Abraham is assigned to be the prophetic patriarch of innumerable posterity; Joseph Smith is called to

32. Young's title seems to refer not to *The Well-Tempered Clavier* directly, but rather to the widespread (but, as is now known, inaccurate) conception of Bach's work as a celebration of the institutionalization of equal temperament.

restore Christ's church in the latter days; and, among the souls foreordained to artistic stewardships, La Monte Young is called to teach man, through music, about his 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.³³

It is tempting, then, to look for connections operating at a deeper level than the rhetorical or terminological. A closer examination of Mormon cosmology and some of its cultural manifestations will identify ways in which Mormon paradigms inform Young's music in more fundamental ways.

33. Young's statement is quoted in Toop, *Ocean of Sound*, 179. Compare it with the following excerpt from the introduction to an official booklet used by Church missionaries in teaching persons preparing for conversion: "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?" From "Discussion 4: Eternal Progression," *Uniform System for Teaching the Gospel* (Salt Lake City: Corporation of the President of the Church of Jesus Christ of Latter-day Saints, 1986), pamphlet 4, p. 1. Coke Newell articulates the same three questions in the introduction to his overview of Mormonism. See Newell, *Latter Days: A Guided Tour Through Six Billion Years of Mormonism* (New York: St. Martin's Press, 2000), xv. Similar examples appear throughout church curricula and media materials.

5. ABRAHAMIC COSMOLOGY AND THE MORMON IMAGINATION

*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?*³⁴

BACK in Gilgal Garden, near the Joseph Smith Sphinx, one encounters another statue full of curious symbols: a rendering of the stern-looking Bishop Child himself, his quartzite torso supported by brick-hewn legs and feet. He stands inside a large alcove, the interior of which is adorned, on one side, with the typical tools of the stonemason's trade, and on the other, with an engraved depiction of the Salt Lake Tenth Ward meetinghouse. Under his left arm he holds rolls of blueprints; under the right, holy scriptures. Child's self-rendering exemplifies how he sought to emulate his Maker both by preaching to his congregation and by building the chapel in which they met; his visual representation of these dual roles typifies paradigmatic Mormon attitudes regarding the relationship between the spiritual and the material.

34. W.W. Phelps, "If You Could Hie to Kolob," in *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 was a close associate of Joseph Smith, and was present when Smith recorded the cosmological account found in the Book of Abraham. In the 1985 edition of the hymn book Phelps's text is set to the English tune "Kingsfold,"

in an arrangement by Ralph Vaughan Williams borrowed from the *English Hymnal*. One might even consider Phelps's 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...."

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

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 nihilo*."³⁵ Perhaps the most concise reflection of this redefinition is found in Abraham's cosmological vision, where 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.³⁶

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 asserted this 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.”³⁷ 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 ontological sphere.... His existence in the same ontological sphere that we inhabit makes impossible [for Mormons] the separation of the worldly and the heavenly.”³⁸ For Mormons, then, faith is essentially a kind of cosmological pragmatism.

This manifests itself in a variety of ways within Mormon culture. Erich Robert Paul observes that, because Mormons think 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 specu-

36. Abraham 3:2-3.

37. *Doctrine and Covenants* 130:3, 22.

38. James E. Faulconer, “Divine Embodiment and Transcendence: Propaedeutic Thoughts and Questions,” *element: an e-journal of mormon philosophy and theology* 1, no. 1 (no date), section 14.

Accessed at
<<http://www.nd.edu/~rpotter/element4.html>>

onto just intonation, or in imbuing the harmonic series with a kind of archetypal, ontologically unifying significance. The first of these is the curious acoustical and hermeneutic 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. Olivier Messiaen reported that Roustit was the star student in the theory class that Messiaen taught at the Conservatory, and Roustit figured 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 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, non-denominational 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; subsequent to its rejection by his committee at the Sorbonne, he published it independently in 1970 under the title *Prophétie musicale dans l'histoire de l'humanité*.⁴³ The preface, penned by a perceptibly reluctant Messiaen, nonetheless warns those who read the words of his former pupil that:

43. 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 *Prophesy in Music: Prophetic Parallels in Music History*.

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.⁴⁴

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 led him to conclude that there should have been some kind of enormous spiritual outpouring upon the Earth between the years 1798 and 1844, which would mark the beginning of the last days spoken of in the Bible.⁴⁵ 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 (and his assassination in 1844), Roustit discovered a belief system in which time, space, tones, heavenly

44. Roustit, *Prophecy in Music*, trans. Green, 14.

45. 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 outpouring-to-have-taken-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 prophecy. It was for this reason that he so easily accepted the claims of Mormonism. See John A. Green, "Les Derniers Jours," *Ensign*, 30 December 1974. The *Ensign* is the official monthly publication for the Church of Jesus Christ of Latter-day Saints.

bodies, and history could be integrated into the great, cosmic, immanent whole that he had already imagined; he was baptized as a Mormon in 1971.⁴⁶

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.⁴⁷ Doty's family converted to Mormonism during his childhood, and he practiced the religion for several years before leaving the church at age seventeen. He eventually went on to co-found 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.⁴⁸ Tenney, a former Bell Laboratories composer who now serves on the faculty of 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.⁴⁹ Ervin Wilson is a central figure among current microtonalist composers

46. I should make it clear that I find Roustic's book problematic with regards 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 Roustic's studies never lead him to explore issues of tunings; throughout the book, equal temperament is considered the "norm" from which higher harmonics "deviate," rather than vice-versa.

47. 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.

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

49. 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 was also the subject of an extensive tribute in *Perspectives of New Music* 25, nos. 1 & 2 (1987); also, an extended interview and a number of his scores can be found in *Musicworks* 27 (1984).

and theorists, who consider him something of an heir to Harry Partch, both for his innovative systems as well as the instruments that 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 a remote Mormon colony in northern Mexico. He studied physics at Brigham Young University (his uncle was the school's president) before turning his attention to music and moving to California, by which time he had distanced himself from his inherited faith. He served in the military during the U.S. occupation of Japan, and his exposure to Japanese culture piqued a general interest in non-Western tuning systems and musical philosophies. He has since become an expert in Western and non-Western scales and temperaments, and has developed a number of his own dauntingly complex tuning systems and algorithms as well.⁵⁰

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 sense of Mormon cultural identity.⁵¹ He also sees a strong symbiotic connection between his particular kind of musical pursuits and two other great passions of his: genetics and genealogy. Indeed, one finds striking organizational—not to mention visual—similarities between Wilson's pitch ratio diagrams, his Mendelian records used in breeding special strains of plant species, and the pedigree charts on which he plots the

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

51. For his own enjoyment, and that of the Mormon missionaries that visit him on occasion, Wilson has even rendered some of his favorite church music in alternate tunings. According to Wilson, "Mormon hymns in just intonation are *quite inspiring*." Ervin Wilson, telephone conversation with the author, 9 January 2002.

note name	E _b	E	F	F _#	G	G _#	A	B _b	B	C	C _#	D	E _b
ratio	1/1	567/512	9/8	147/128	21/16	1323/1024	189/128	3/2	49/32	7/4	441/256	63/32	1/1
distance from E _b *	0	177	204	240	471	444	675	702	738	969	942	1173	0
width of "semitone" *		177	27	36	231	-27	231	27	36	231	-27	231	27

* in cents, rounded to the nearest cent

Figure 7. The scale used in *The Well-Tuned Piano* (adapted from Gann 1993)

them in this way for the sake of performance convenience: because of the variety of semitone widths (some smaller than a sixth-tone) in the scale, two of the 3/2 intervals (namely, those with F# or G# as their lower member), would fall under the fingers as tritones; by reordering the notes, Young spells them as perfect fifths.⁵⁷

In assessing the formal aspects of the piece and the tuning system it utilizes, 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 teleologically develops and combines over the course of the work; 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."⁵⁸ Gann surely recognizes the artificiality of this dichotomy and, aware of the stereotypes already in circulation, employs it for expository 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.⁵⁹ 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 1987 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 E₁ that falls eleven octaves

57. *Ibid.*, 137-8.

58. *Ibid.*, 149.

59. Allison Clare Welch, *The Influence of Hindustani Music*, 367-371; Claman, *Western Composers and Indian Music*, 259-65.

below the lowest E_b on a standard piano (or ten octaves below Young's Bösendorfer). 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. The tuning is thus an elaborate embodiment of "universal structure."⁶⁰

The overtones that serve as the pitches in the *Well-Tuned Piano* scale appear (in harmonic order, of course, not scale order) within the first several contiguous octaves of the subsonic E_b 's harmonic series, as shown in Figure 8. The $G\#$ actually appears for the first time in the harmonic series within the lowest octave on La Monte Young's piano—the only pitch whose first appearance in the harmonic series occurs within the piano's range. Since all of the pitches appear in the series below this point, and since once a pitch class appears within one octave of the harmonic series it appears in every subsequent octave from there on up, the scale repeats at the octave across the full range of the piano.⁶¹ The generative E_b falls as low as it does, then, in order to allow enough room for the entire pitch collection to appear by the time the har-

60. In this regard the *Well-Tuned Piano* finds a curious corollary in a work by one of Young's ex-Mormon colleagues. In James Tenney's *Saxony* from 1988, a saxophonist using a digital-delay system sets up a series of sustained and harmonically-related pitches, over which s/he improvises 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_b . Too much should not be read into the use of this note, however (*Das*

Rheingold, The Magic Flute, etc., notwithstanding); Tenney's E_b relates to the instrument for which the piece is composed, and the E_b in the *Well-Tuned Piano* similarly relates to Young's background as a saxophonist (Young spent hours at a time improvising in E_b and transferred his preference for this key to his keyboard improvisations). Tenney has composed a number of other overtone-based pieces, including *Spectral CANON for CONLON Nancarrow* (1974) and *Voice(s)* (1984).

61. It may be helpful to remember that the ratio given for each pitch in the scale describes the relationship between the harmonic where that pitch class first appears in the overtone series and a nearby octave transposition of the fundamental. So, for example, the relationship between any $G\#$ in the piece and the E_b below it is exactly proportional to the relationship between the 1323rd harmonic (the first harmonic where that pitch class occurs) and the 1024th (an octave transposition of the fundamental E_b).

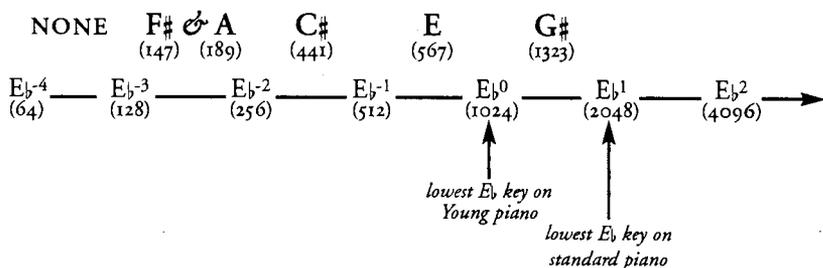
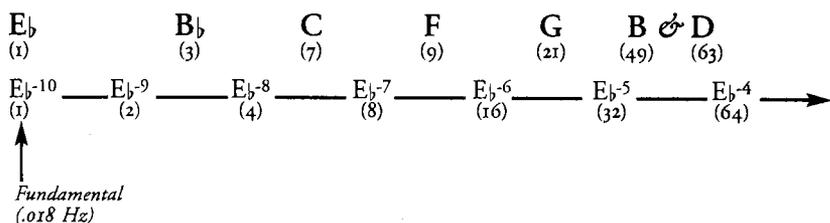


Figure 8. Derivation of the harmonic series of pitches in the 1981 *Well-Tuned Piano Scale*. Placement of note indicates the octave within which the note first appears in the harmonic series of the low E_b . Numbers in parentheses are the harmonic numbers of the respective pitches. Note that the low E_b is 14 octaves below an E_b^4 that is tuned down from the standard 329.6 Hz to 297.98 Hz.

monic series arrives at the reality of the keyboard.⁶²

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."⁶³ Schaeffer is, of course, hyperbolizing or mythologizing, since the frequency of the fundamental E_b is about 0.018 Hz, or 56 *seconds per cycle*. Nonetheless, the idea of hearing a mysterious, sub-sonic fundamental is a poignant metaphor for sensing the audible periodicity between pitches—a quality that the existence of a 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 intuitive use of psychoacoustical principles to the approach early impressionist painters took to combining patches of paint in such a way that certain colors would appear to the eye even though they existed nowhere on the canvas.⁶⁴ 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 that result in "clouds" of sounds of the kind Molino describes. From these clouds emerges a variety of sounds and resonances not

62. The theoretical fundamental E_b was not quite so low in earlier versions of the tuning system. Initially, the G \sharp and C \sharp were based on harmonic 93 and 31, respectively. The pitch class based on the highest harmonic was the E, derived from the 279th. The theoretical fundamental of the series, then, only had to go eight octaves below the bottom of Young's keyboard in order to introduce all the pitch classes before arriving at the threshold of performability (that is, the bottom of the keyboard). See Gann, "The Well-Tuned Piano," 140-1.

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

64. Young, "Notes on *The Well-Tuned Piano*," 7. Young quotes from a personal communication with Molino.

accounted for in an inventory of the notes actually being struck.⁶⁵

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 Fourier analysis. Molino is more fascinated, however, by the way in which Young achieves the purely *psychoacoustical* phenomenon known as the “virtual fundamental.” It occurs when a fundamental tone is inferred from the presence of some of its harmonics, 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. So, for example, if one generates the fifth, sixth, and seventh harmonics 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.⁶⁶

Of course, even though Young provides us with a keyboard full of harmonics that do, in fact, result in virtual resonances and other striking 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_b that low, but he does seem intent on blurring the envelope of the unhearable and stretching our ears (and brains) further into the lower

65. Gann, for example, reports hearing “foghorns, voices, bells, even machinery” in these passages. See Gann, “*The Well-Tuned Piano*,” 149.

66. J. Pierce, “Introduction to Pitch Perception,” in Perry R. Cook, ed., *Music, Cognition, and Computerized Sound: An Introduction to Psychoacoustics* (Cambridge: MIT Press, 1999), 58-64. James Pritchett observes this 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 to another (via the delay system), this low phantom sum appears, like a mirage.” Later Pritchett continues in this vein: “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.” See Pritchett, liner notes to Ulrich Krieger, *Walls of Sound* (OO Discs, OO 32, 1997).

range than they usually venture. As the work approaches the two hour mark (in the 1987 Gramavision recording), Young presents a variation on the “Theme of the Dawn of Eternal Time” above successively lower E \flat bass tones: at 1:36:51 it 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 which 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 lower limits of the ear’s frequency range (as a rule of thumb, the low frequency threshold 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 not even heard as a pitch at all, 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*, or “struck” music, music of the air, becomes the *anahata*, or “unstruck,” the music of the ether. In this regard Young is fond of quoting Alain Danielou, who compares the *anahata* to “what neo-Pythagoreans called ‘music of the spheres.’ It forms numerical pat-

terns which are the basis of the world's existence.... In this unstruck sound the Gods delight. The Yogis, the Great Spirits, projecting their minds by an effort of the mind into this unstruck sound, depart, attaining Liberation."⁶⁷ This would seem to describe 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 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. (Abraham 3:2-3)

Thus Kolob is to the organization of heavenly bodies what God is to the organization of intelligences. These two systems are joined by a third, in which the reckoning of time is subject to the periodicity of Kolob and the time-scale of God.

...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....(Abraham 3:8-9)

67. As quoted in Young, telephone conversation with the author, 20 December 2001. The quoted passage appears in Alain Danielou, *The Ragas of North Indian Music* (London: Barrie and Rockliff, 1968), 21. I have heard Young refer to this same passages on other occasions as well.

These organizations of time, space, and intelligence all outline a general operative law of the universe: if there are two “facts,” of a given order, and 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. 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 nearly-subsonic E_b 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-intonational pitches suggests the hierarchy within which those pitches exist. A comparison of the hierarchies as described in Abraham’s cosmological vision, together with my own non-scriptural paraphrase (altered to the context of *The Well-Tuned Piano*), illustrates the point:

HIERARCHY OF SPACE	HIERARCHY OF TIME	HIERARCHY OF INTELLIGENCE	<i>HIERARCHY OF TONES</i>
The movements of all heavenly bodies governed by Kolob	All reckoning of time governed by the reckoning of time of Kolob	All intelligences governed by God	<i>All tones governed by the Fundamental Tone</i>
“If two things exist, and there be one above the other, there shall be greater things above them; therefore Kolob is the greatest of all [the stars] that thou hast seen, because it is nearest unto me....”	“...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....”	“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.”	<i>If two pitches exist, and there be one below the other, there shall be lower pitches [below] them; therefore, the fundamental [E_b] 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_b is the fundamental, and is lower than they all.⁶⁸</i>
[Abraham 3:2-4, 16]	[Abraham 3:8-9]	[Abraham 3:19]	[Paraphrase]

68. By using the term “period” instead of “frequency,” I could have retained the qualifiers “higher” and “greater” from the original texts, since period (taken to mean the amount of time taken to complete a single cycle) is the inverse of frequency. It seemed simpler, however, to simply invert the direction of the hierarchical flow in the scriptural passage.

The pitches qualify as “facts” only when tuned rationally; because 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.”⁶⁹

Residing in the realm of the subsonic, La Monte Young’s low E_b 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 unheard 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—OM⁷⁰

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 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.

69. Riley, liner notes to *The Well-Tuned Piano*, 2. Again, Pritchett 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.” See Pritchett, liner notes to *Walls of Sound*, emphasis in original. Larry Polansky expresses similar sentiments about another of Tenney’s overtone-series pieces, *Spectral CANON for CONLON Nancarrow* from 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.” See Polansky, “The Early Works of James Tenney,” *Soundings* 13 (1984): 225.

70. Young, liner notes to *The Well-Tuned Piano*, inside cover (preceding the first numbered page).