The Theory of Impossible Melody

If there could be a single word (or metaphor) that describes Larry Polansky's musical worldview it would have to be *heterophonous*—not merely from the standpoint of his formal sonic concerns—but as it pertains to his perception of life and related phenomena. Larry loves to encourage the coexistence of disparate but related perspectives, ideas, traditions, structures, and artistic works. This extraordinary capacity to seek out unity through abundance is undeniably the result of two fundamental character traits, an insatiable intellectual curiosity coupled to an immense generosity of spirit. These traits are not only manifest in all of his public activities—composer, performer, teacher, publisher, and theorist—but also in quieter, less public ways. He is both a constant resource of knowledge and a resource of constancy in many people's lives, someone who is willing to serve the cause of creative cultural renewal through both intellectual contiguity and direct support of community.

Another underlying property of Larry's work is the pursuit of technical mastery; a deliberate purposeful dedication to understanding his materials and to perfecting the technical skills necessary for his various roles as composer, performer, computer-programmer, writer, or teacher. It is always a revelation to me how deeply he delves into a subject of interest and how the most seemingly unrelated intellectual concerns eventually, somehow, find mutual expression in a composition, theory, or joke. He is a true polymath and the only person I know who can probably solve a differential equation, play an obscure folk tune in three or four historical tunings, and tell you who played in the World Series two decades ago, all at the same time.

Among the lineages of knowledge that he has woven together in his creative work, as both a composer and theorist, have been mathematics, intonation theory, cybernetics, systems theory, artificial intelligence, musicology (both Western and non-Western), American Sign Language, and Jewish mysticism. He has combined these and many other fields of study together into some of the most important music written by anyone of his generation while retaining status as the composer who is most worthy of being called a true theorist. Larry has managed to change the way we think about music through a combination of profound engagement, self-deprecating wit and playfulness, and dedication to the spirit of intellectual continuity—what Thomas Kuhn called exemplars—that can be shown through an injunctive process. In many ways his compositions are themselves injunctive demonstrations of his theoretical insights that stand as critiques of the theoreticism that is now endemic to the art world.

This intellectual integrity and facility has also been responsible for one of the most interesting characteristics of Polansky's compositional output. His music is one of the most successful, and rare, examples of a confluence between two, generally conflicting, twentieth-century musical streams. Like his mentor, James Tenney—and many other late twentieth-century experimental masters who were inspired by the aesthetic innovations of Cage—Polansky creates musical expositions of phenomenal reality. Sometimes these are based in psychoacoustic science and sometimes they are grounded in mathematical formalisms. Sometimes they explore both at once. What he also manages to do—and this is where he succeeds at the abovementioned confluence—is to often reveal these concepts within an expressive musical frame that is strongly linked to more traditional musical values. In fact, this seems to be an overt concern in his work as a purposeful intent: to demonstrate the living properties of diverse traditions of knowledge and their correlation with new insights, aesthetics, and technical resources, both within and outside of music per se.

The first work on this recording, *tyvarb (B'rey'sheet)*, embodies many of the aforementioned ideas. Here we have an amazing marriage between a traditional Jewish cantillation melody and artificial intelligence concepts. It is also an example of emergent heterophony that evolves from its most complicated but disordered state to an "omega point" of unity and order. The metaphoric correlation between the textual source and the composition's global structure is both obvious and satisfying; an example of what Tenney described as a transparent structure (in this case a *ramp*) that allows the listener to quickly grasp the formal device in order to concentrate on the aural "facts" being revealed. After the melody is initially revealed, it is buried within the emergent texture that it generates. We therefore have two forms of emergence revealed by the overall listening experience. While the heterophonic variations are all created from the melody as a generative kernel, their rule-based constraint over time allows for both the revelation of their source and eventual unification with it. Along the way we almost inadvertently experience (or perhaps revisit) moments of harmonic and contrapuntal structure that are reminiscent of more historically familiar melodic, harmonic, and rhythmic concepts.

A significant compositional device within *tyvarb (B'rey'sheet)* involves the way in which the computer makes decisions based on its analysis (hearing) of the sung melody. The underlying assumptions extend from Polansky's concept of paratactical tuning where time-variant intonation is enabled through digital means. Rather than strict obeisance to a preset gamut of pitches—or their organization into a fixed scale of intervals—the computer allows for the dynamic alteration of a "tuning system" on the fly.

Another example of how Polansky articulates traditional ideas through novel means is his series of *Four Voice Canons*. These works represent a substantial part of his output as a composer with three of the compositions from this series (currently 25 works) represented on this disc. The earliest is the **Four Voice Canon #3**, dating back to 1975, for digitally synthesized sounds. As in all of the *Four Voice Canons,* the deceptively simple compositional idea of a mensuration canon is taken into new compositional and perceptual terrain. Rather than the more straightforward metric augmentations or diminutions (prolations) used to allow the musical voices to occur at different relative speeds—typical of the historical antecedents of the mensuration canon found in Renaissance composers such as Ockeghem—we see the idea occur as a proportional duration ratio, based on the golden mean, applied computationally across all voices. The voices themselves are generated by permutations of basic elements ordered by an algorithm borrowed from elementary group theory. Once the listener understands the basic rules, what might otherwise appear as a dense sonic aggregate becomes a transparent listening process of growing contrapuntal complexity.

In the early canons, structural details are based on lexical permutations of a few basic elements that can be applied to various musical parameters. Formal preservation of the mensuration canon idea is easier to imagine than in the later works. In this sense, the inclusion of **FVC #3** almost functions as a kind of listening guide to the much more complex canonic structures to follow. In all cases, however, it is basically the same concept—sequential appearance of new contrapuntal lines that move proportionally faster and share conceptual details that define some sort of heterophonic "resonance"—that is at work. Sometimes, as in traditional prolation techniques, these concepts can be applied to pitch and rhythmic details but become more generalized to a greater range of structural and sonic parameters as the series of canons progress. Since what defines the internal cohesion of details within the individual voices of the canon can be very abstract, the idea of polyphonic texture becomes more of an emergent property from a complex range of nested musical behaviors.

Epitaph (Four Voice Canon #21) uses five guitar improvisations by Polansky as its material from which to fashion the contrapuntal texture for the canon. The improvised material is initially constrained by some simple imposed limits as to the kinds of gestures to be performed and by a progressive expansion of the tuning palette in terms of prime limits 1 through 11 (1, 3, 5, 7, 11). The improvisations are then reorganized based on properties recognized through a variety of analytical software procedures. A highly organized composition emerges from seemingly non-directed improvised material through a succession of decisions made, based on the progressive state—and intrinsic features—of the transformed material. This procedure is a computer-aided version of what composer Kenneth Gaburo called a "scatter technique" where an initial set of material—whether a row of pitches, a language statement, or other loosely generated or found material—becomes the generative code from which a series of transformations takes place. Each subsequent transformation is always based on a rigorous analysis, and respect for, the intrinsic condition of the material at each compositional stage. The seemingly arbitrary starting point becomes the basis for an organic and highly cohesive structure to arise.

Up until the nineteenth century, when practitioners within the Western art music tradition (and some non-Western cultures) spoke of *music theory*, the consensus knowledge base was largely inseparable from what we now refer to as intonation theory. The standardization of the twelfth root of 2—and its inseparability from the familiar keyboard archetype—was very late in coming. Its two-century reign as the dominant paradigm fully solidified the Western assumptions of keys and tonal centers within a set temperament until other options faded into distant memory. The twentieth-century resurgence of interest in both historical intonation theory and "microtonal" scales was a valuable assertion against the somnambulence of convention but has had a tendency toward cult-like partisanship, posing alternative tunings as some sort of logical opposite to 12-tone equal temperament. Partch was one of the first to state this antagonism and many others have followed suit. Polansky has taken a different course that combines his thorough understanding of intonation theory, his mathematical sophistication, and the influence of Tenney in stating the necessity for a theory of music that is truly theoretical in the scientific sense.

Four Voice Canon #23b (freeHorn canon) and ***Psaltery*** are both examples of Polansky's more expansive vision of intonation, one that transcends the more typical assumptions and solutions of "tuning theory." In most uses of Just tuning or large-number equal temperaments—capable of achieving or approximating desired interval ideals and complex harmonic spaces—there is a tacit assumption of a fixed gamut of pitches that provides a structural basis for composition. An alternative to this approach is what Lou Harrison called Free Style: "to freely assemble, or compose with whatever intervals one feels that he needs as he goes along." Polansky has argued that such an approach can really only be achieved through electronic means, and these two pieces share a common strategy to that goal. They are explorations of the experimental potential for looking at harmonic relationships from a different perspective, one that views this potential from a meta-level and not from inside a fixed scale. Both pieces originate from the concept of having different harmonic series replace each other over time. In ***Psaltery*** this is managed through a set mapping between fixed groups of such series. ***Four Voice Canon #23b (freeHorn canon)*** extends this idea through use of Polansky's computer program *freeHorn* that is capable of generating any number of series, at any relationships, over time.

What must now appear obvious is that one of Polansky's favorite compositional exemplars is to balance the specified with the emergent or improvised. Once again we can see his desire to merge what might otherwise seem contradictory and bring together two different streams or traditions of historical musical activity: composers and improvisers. ***Simple Actions/Rules of Compossibility*** is composed at the level of its generative rules, but the overall structure arises as a self-organizing process of interaction between the performer and computer. The result might be metaphorically understood as similar to the distinction

between strategy and tactics. The performer can introduce strategic changes but cannot intercede deeply into the tactical details of the sonic behaviors once the system is engaged.

Polansky states that the idea for this piece was inspired by Marvin Minsky's "society of mind," where complex intelligences result from simple individual intelligences sharing a common informational ecology. Such a conceptualization also shares much with an intellectual tradition that was divergent from the information-processing model of Minsky's AI: the field of Artificial Life that grew out of "second-order" cybernetics and its emphasis on the autonomy of living systems (autopoiesis). While these kinds of computational models also specify simple rules for the interaction of virtual entities—from which a very complex environment of behaviors can emerge—they place emphasis on the autonomous nature of the agents rather than on the informational correspondences that they might exhibit. **Simple Actions** can actually be located within either of these computational models, but I find it interesting that the initial versions of the piece arose at the historical moment when this intellectual bifurcation largely took place (mid-1980s). The work can be heard as an example of how art often parallels or anticipates the formalization of concepts in other fields of inquiry.

Another element that shapes the final composition is the inclusion of a text (**Rules of Compossibility**) by the artist Chris Mann. Over the past thirty years or so, Chris has generously offered up his voice and words for collective chain-sawing by the electro-acoustic music community more often than probably any other living writer or text-sound artist. Here, the pitch and loudness of his voice function as another control parameter.

Within such a truly amazing proliferation of ideas and sounds, Larry Polansky has also managed to persist at being one of the most effective champions of other composers (and thinkers). His musicological activism toward the work of important twentieth-century composers has probably saved some (Johanna Beyer) from complete evaporation. This dedication has been most overtly manifested through his publishing endeavor with his wife, Jody Diamond, *Frog Peak.* This organization serves as a refuge for the creative work of many dozens of important musicians, artists, writers, and other intellectual misfits of diverse stripes. It is "advertised" as a publishing collective and maintains a unique editorial policy: It is the artist that is being invited to participate and—once absorbed into the collective—it is the artist who determines what *Frog Peak* distributes.

This extraordinary attitude of trust toward others is also a statement about regarding the conservation of culture as a living process. As we have learned at high cost from the experience of conservation biologists, to merely preserve a species is never enough. Such an approach merely renders living things brittle. We must also preserve their adaptive capacities through ensuring that their habitats and ecological networks remain intact. Such an understanding is part of an even larger global truth: Environmental health and social justice cannot be isolated from each other. The same is true of the incredible richness and diversity of human culture. It is not enough to merely preserve artifacts. They must be a part of an ever-evolving human experience that is itself alive. Larry, perhaps more than any other composer I know, has not only dedicated himself to the creation of beautiful and lasting contributions to our cultural fabric, he has done so with an understanding that his work can survive only when it is part of a living system that allows others to also prosper. With that important responsibility in mind, he has always taken serious steps toward this essential goal. For all of this I am deeply grateful.

—David Dunn

David Dunn is a composer who rarely presents concerts or installations and instead prefers to lecture and engage in site-specific interactions or research-oriented activities. He lives in Santa Fe, New Mexico.

Composer's note

tyvarb *(B'rey'sheet) (in the beginning . . .) (Cantillation Study #I)*
(1985; revised 1987, 1989)
tyvarb is for solo voice and live interactive computer. It is one of the Cantillation Studies, a set of pieces based on computer-aided melodic transformations of the traditional Hebrew tropes and melodies used for singing the Torah. Each piece uses a seventeen-verse section of the Torah and is named for the first word of the text. Other works in the set are lvmlw *(V'Ieem'shol) (And to rule . . .)* for five flutes (verses 18–35 of tyvarb); and twdlwt hla *(Eleh Tol'd'ot) (These are the generations . . .)* for four marimbas and live computer.

I envisioned tyvarb as an evolution from disorder to order, manifested in the relationship between the voice and the voice-controlled computer. The soloist sings the cantillation melody, unaltered. The computer listens to the voice and reacts harmonically, rhythmically, melodically, and timbrally. The computer variations are gradually constrained in each of these parameters over the course of the piece until the voice and the computer are in unison. Four sine waves, distorted at first by simple real-time modulation techniques, respond to the voice by decreasing the depth and degree of their modulation as the piece progresses. The computer "invents" a set of tuning rules and intervals for each verse, based on successively more consonant just intonation (starting with 17-limit ratios in the first verse, and constrained to 7-, 5-, and 3-limits near the end). Melodic and rhythmic variations are gradually constrained as well, resulting, for example, in the "chorales" near the end of the work.

Four Voice Canons (1975–)
The four voice canons are "orchestrations" of one idea, that of a *mensuration canon,* in which successive voices enter later and move proportionately faster. Consequently, density and rhythmic complexity increases over time. In the earlier canons (like *#3*), each voice consists of a computer-generated list of all the possible permutations of four or five elements, where, in general, each member of the list is as "close as possible" to the previous. The list values are then applied to different musical parameters. In many of the later canons (like *#21, #23b*), the idea of a permutation list (as well as the number of voices) is replaced with other unifying heterophonic formal ideas. There are, to date, about twenty-five of these canons.

In *#3* (1975), for digitally synthesized sounds, the permutation lists are applied to spatial location, envelope, amplitude, pitch, duration, and several aspects of timbre. The duration ratio between all voices is the Golden Mean. Despite its number, it is the first in this set.

Epitaph (Four Voice Canon #21)(tmfg) (stereo version) (2006/8)
Epitaph is a canon using my own guitar improvisations as subject matter in conjunction with software (MEAP) and some ancillary Java routines for "arranging" those improvisations by "feature." The source material consists of five non-directional guitar improvisations on fretless electric guitar, using limited materials (harmonics, glissandi, tapping, open strings, etc.). Each guitar part uses a different tuning, based on harmonic series 1, 3, 5, 7, and 11. Each improvisation is shorter than the previous, in the manner of a mensuration canon.

Each of these is "sorted" in four different ways by the software (creating 20 distinct soundfiles). The sort criteria are: pitch, chroma, segment length, and a combination of centroid and spectral stability. Segmentation thresholds are varied in such a way that successive voices (and sorts within voices) tend to have shorter segments.

The resultant twenty sonic "lists" are run through a few simple Java programs which alter the start times of the canonic voices, and mix them back together. Successive "sorts" of each voice have slower fades, so that the four-minute piece is composed of twenty (4 x 5) staggered and overlapping fade-ins. In this stereo version, these twenty voices are mixed in such a way that each voice moves randomly in the stereo space, eventually settling in one of four locations in the stereo field. Each "sort" type has its own location. For example, the pitch-sorts for each voice end hard-left, the length-sorts hard-right, and so on.

Four Voice Canon #23b (*freeHorn canon*) (2008)
A few years ago, I wrote a general-purpose computer program called *freeHorn* to include and extend the harmonic idea of *Psaltery,* that of harmonic series replacing each other over time. *freeHorn* generalized the *Psaltery* idea/form (which I had, in the interim, used in a number of pieces, like *Choir,* and *Horn*) to include any number of series, at any relationships, over any time span, as well as a number of other variable features. I intended this software to be a live-performance tool, and have performed with it a number of times (as have others, including the performer on this recording, Robin Hayward).

FVC #23a and FVC #23b use this software to make multi-track canons. The previous work, *#23a (freeHorn canon)* (for Charles Dodge) is a seven-voice canon for tape alone, each voice proceeding thru the 1:3:5 trajectory of *Psaltery,* but in this case each voice is based on a different fundamental (and consequently different tempo ratio). *FVC #23b,* the piece on this recording, is a nine-voice tape canon with corresponding tuba voices. In this work, also a mensuration canon, the tempi/beginning pitch relationships of the harmonic series are based on a subharmonic series, or "otonality" (in Harry Partch's terminology), from twelve down to three (12:12, 12:11, 12:10, 12:9, . . . 12:3), thus encompassing two octaves. The use of the "undertone" series derives from a complex microtonal tuba fingering system developed by Robin Hayward. In *FVC #23b,* each voice modulates (by the replacement of harmonic series) from its distinct fundamental to a common fundamental (A = 1/1 = 55 Hz) over its life. Lower voices move up, higher voices move down.

FVC #23b
Frequency movement
9 voices
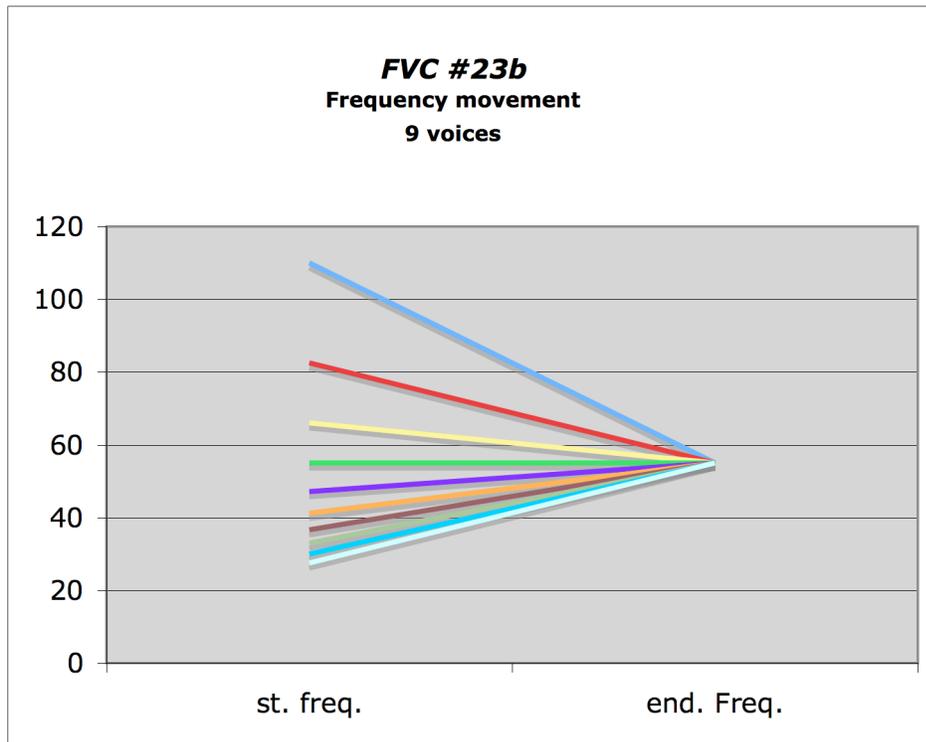
Simple Actions/Rules of Compossibility (1989) (Larry Polansky and Chris Mann)
Simple Actions (for Daniel Kelley) . . . was originally written as an improvisation for solo performer and computer, and performed this way many times in the mid-1980s. The HMSL program is based on Marvin Minsky's "society of mind" idea, namely, that complex intelligences often result from the interaction of simple individual intelligences ("agents") sharing a common informational terrain. In *Simple Actions,* easily described musical behaviors ("glissandi," "beeps," various timbral changes, melodies, and modifications of signal processing parameters) interact to form complex musical terrain. The software allows the performer to activate, deactivate, and shape the behavior of hundreds of these musical "critters." The performer cannot control the details of any moment, but may interact with the environment to produce large-scale changes.

After performing this piece solo for some years, I added software to incorporate the voice of the Australian poet, composer, and artist Chris Mann. The text of "Rules of Compossibility" is from his larger work *Tuesday.* Mann's voice serves as one of the musical "actions"— his pitch and loudness interact with the other processes.

Psaltery (1978–9)
Psaltery (for Lou Harrison) consists of fifty-one pitches, made from tape-manipulated recordings of one string of a hand-held bowed Appalachian psaltery (built by Capritaurus Instruments in Santa Cruz, California). The fifty-one pitches are the first seventeen harmonics of three fundamentals, related to each other as ratios of 1:5:3, or a major triad. The harmonics from the higher series (5 and 3) are thus higher harmonics of the first. After building up the initial series on the fundamental, pitches from the next series (on the 5th harmonic, or the M3rd) begin to replace their closest neighbors until the series on 5 is complete. This process happens twice more, moving to the P5th (on 3), and then back to the fundamental. Finally, the series on the fundamental drops out.

Harmonics enter according to their "prime complexity" in this order: 17, 13, 11, 14, 7, 15, 10, 5, 9, 12, 6, 3, 16, 8, 4, 2, 1. More distantly related harmonics of a new series enter first, cross-fading with closest pitches from the current series so that, at first only a mistuning is heard. Gradually, lower harmonics of the new series begin to imply a new fundamental, through difference tones and our own sense of harmony. The initial buildup of the first series is in reverse order, the piece ends on the fundamental, after its pitches drop out from 17 down to 1.

Larry Polansky is a composer, theorist, teacher, writer, performer, programmer, editor, and publisher. He lives in Hanover, New Hampshire, teaches at Dartmouth College, and is the co-founder and director of Frog Peak Music (a composers' collective).

Phil Burk is a computer programmer and designer who specializes in interactive and experimental music systems. In 1981, he developed HMSL (Hierarchical Music Specification Language) with Larry Polansky and David Rosenboom at the Mills College Center for Contemporary Music. Phil then worked at the 3DO company developing the first DSP-based sound synthesis system for a video game console. Current projects include JSyn, a music synthesis API for Java; JavaSonics ListenUp for recording and uploading voice in a Web page; PortAudio, a cross-platform audio API; and TransJam, a client/server system for multi-player interaction on the Web.

Jody Diamond is a composer, performer, and scholar who has specialized in music for Indonesian gamelan for close to forty years. She is an Artist-in-Residence at Harvard University with the instruments of Gamelan Si Betty, built by Lou Harrison and William Colvig. Her compositions are played internationally; as a vocalist, she performs both experimental and traditional American and Javanese music. She founded the American Gamelan Institute in 1981, and is co-founder and co-director of Frog Peak Music (a composers' collective).

The tuba player **Robin Hayward**, born in Brighton, England, in 1969, has been based in Berlin since 1998. He has redefined the tuba's potential both in the areas of noise and microtonality. His compositions for other instruments reflect a similar experimental, medium-specific approach. His specific playing ability has been utilized by composers such as Alvin Lucier and Christian Wolff. He has toured extensively both solo and in collaboration. His research to date has been documented in his solo CD *Valve Division* and various collaborative releases. Active in many contemporary music ensembles including Phosphor, and Kammerensemble Neue Musik Berlin, in 2005 he founded Zinc & Copperworks for continued research into brass instruments.

SELECTED DISCOGRAPHY

Change. Artifact Recordings ART 122.

DIY Canons. Pogus 21036. (2 CDs of works by other composers based on ideas by Polansky).

Epitaph (*Four Voice Canon #21*) (*tmfg*) [Original quad version]. Included on *[re]*. Everglade DVD. (Available at http://www.everglade.org/current.htm)

Four Voice Canon #23a (freeHorn canon) (for Charles Dodge). University of Illinois Electronic Music Studios 50th Anniversary CD.

Four Voice Canons. Cold Blue Records CB0011.

Lonesome Road. Martin Christ, piano. New World Records 80566-2.

Movement in E Major for John Cage. Miwako Abe, violin; Michael Kieran Harvey, piano. New World Records 80641.

Simple Harmonic Motion. Artifact Recordings ART 110.

SELECTED BIBLIOGRAPHY

Polansky, Larry. "Cocks Crow, Dogs Bark: New Compositional Intentions," *Leonardo Music Journal*, 7 [1997]: 64-71.

——. "Live Interactive Computer Music in HMSL, 1984–1992," *Computer Music Journal*, 18(2) [1994]: 59–77.

——. "HMSL (Hierarchical Music Specification Language): A Theoretical Overview," with Phil Burk and David Rosenboom*, Perspectives of New Music,* 28(2) [1990]: 136–178.

——. "Paratactical Tuning: An Agenda for the Future Use of Computers in Experimental Intonation," *Computer Music Journal*, 11(1) [1987]:61–68.

——. "Distance Musics I-VI," For Any Number of Programmer/Performers and Live, Programmable Computer Music Systems." *Perspectives of New Music*, 25, nos. 1 and 2 [1987]: 537–544.

——. *Four Voice Canon #13 ("DIY Canon"),* and notes on the Four Voice Canons: http://eamusic.dartmouth.edu/~larry/

Technical Notes and Acknowledgements

tyvarb *(B'rey'sheet)* (Tom Erbe, recording engineer) was digitally recorded live in the Mills College Concert Hall, January 1990, in Oakland, California. *tyvarb* was first realized and premiered on the prototype of HMSL (Vl.0) in 1984 at the Center for Contemporary Music at Mills College, and later adapted for the Amiga computer running HMSL. The two-computer version of this recording was rewritten in HMSL V4.0 with the assistance of Phil Burk.

Epitaph (Four Voice Canon #21) (tmfg) (stereo version). Programming assistance from Douglas Repetto, mixing assistance from Travis Garrison. Software written in MEAP and Java (thanks to Douglas Repetto and Dan Ellis for implementing specific new MEAP features for this piece). Fretless guitar built by Steve Marchione. The 5.1 version was previously released on the DVD *[re]*, produced by Third Practice, Everglade DVDs.

FVC #3 is written in the computer language SAIL; generated and recorded at CCRMA, Stanford University.
Four Voice Canon #23b (freeHorn canon). Mixing assistance from Newton Armstrong and Beau Sievers. Tuba recording by Rashad Becker, Clunk Studios, Berlin, September 2008. *freeHorn* software written in Java and JSyn, by Larry Polansky and Phil Burk.

Simple Actions/Rules of Compossibility. Recorded by Jeanne Parson and Andreas Mniestris, live with no overdubbing, at the Mills College Center for Contemporary Music in October 1989. *Simple Actions/Rules. . .* was premiered in Melbourne, Australia, in August 1989, by the Astra Choir, John McCaughey, director. It uses Amiga local sound as well as special MIDI system-exclusive software written in HMSL for real-time control of a Yamaha FBO1 synthesizer (thanks to Carter Scholz for his advice) and similar software for the Roland DEP-5 signal processor.
Psaltery. Produced and recorded at the Experimental Music Studios, University of Illinois at Champaign-Urbana, 1978, with assistance from Mark Haag and Melissa Birch.

All pieces (except FVCs *#21* and *#23b*) digitally remastered and assembled for CD by Tom Erbe and Larry Polansky at the Mills College Center for Contemporary Music between January and March 1990. HMSL written by Phil Burk, Larry Polansky, and David Rosenboom.

Digital mastering: Paul Zinman, SoundByte Productions, Inc., NYC
Design: Jim Fox

This recording was originally available as Artifact Recordings ART 1004. Three of the tracks, *Four Voice Canons Nos. 4, 5,* and *6* do not appear on this reissue since they have been reissued elsewhere (see Selected Discography). *Four Voice Canons Nos. 21* and *23b* are premiere recordings.

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LARRY POLANSKY (b. 1954)
THE THEORY OF IMPOSSIBLE MELODY

80684-2

1. tyvarb *(B'rey'sheet) (In the beginning. . .) (Cantillation Study #1)* (for Jody Diamond)
   (1985; revised 1987, 1989)   13:18
         Jody Diamond, voice; Phil Burk and Larry Polansky, live computers; Tom Erbe,
         recording engineer

2. *Four Voice Canon #3*   1:48
         computer

3. *Epitaph (Four Voice Canon #21) (tmfg)* (stereo version)   (2006/8)   4:09
         Larry Polansky, fretless electric guitars

4. *Four Voice Canon #23b (freeHorn canon)* (2008)   8:06
         Robin Hayward, tubas

5. *Simple Actions/Rules of Compossibility* (Larry Polansky and Chris Mann) (1989)   22:36
         Larry Polansky, live computer; Chris Mann, voice

6. *Psaltery* (for Lou Harrison) (1978–9)   16:42
         tape

TT: 66:58