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**IN HIS NATIVE TRANSYLVANIA**  
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## Part II

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# Codes, Constraints, and the Loss of Control in Ligeti's Keyboard Works

AMY BAUER

## American Minimalism and the "Semblance of Infinity"

One of the enduring features of Ligeti's style in each phase of his career is his tantalizing use of repeating patterns and processes in a manner that seems to prefigure – especially in the pattern *meccanico* music of the early 1960s – forms of American minimalist practice. Ensemble works of the late 1960s such as the *Ten Pieces for Wind Quintet*, the *Chamber Concerto* and the *Second Quartet* each dedicate one or more movements to such a texture, with the explicit influence of Steve Reich and Terry Riley acknowledged in the final movement of the *Three Pieces for Two Pianos*.

Ligeti spoke freely about this influence in late interviews with Anders Beyer and Erik Wallrup, among others, but his most explicit discussion occurs in an interview with Clytus Gottwald published as "Tendenzen der Neue Musik in den USA."<sup>1</sup> Here he discusses his five

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<sup>1</sup> *The Voice of Music: Conversations with Composers of Our Time*, Anders Beyer, ed., trans. by Jean Christensen and Anders Beyer (Aldershot: Ashgate, 2000), 1–14; Erik Wallrup, "The Multi-dimensional Architecture of Beauty—Interview with György Ligeti," *Nutida Musik*, 4–8; "Tendenzen der neuen Musik in den USA: György Ligeti im Gespräch mit Clytus Gottwald," first published in *Melos/Neue Zeitschrift für Musik* 1 (1975): 266–72; page numbers cite its republication as "Tendenzen der Neuen Musik in den USA. Steve Reich – Terry Riley – Harry Partch," in György Ligeti, *Gesammelte Schriften*, ed. Monika Lichtenfeld, vol. 1 (Mainz: Schott, 2007), 456–69.



months in California, a state he described as “a fruitful soil for completely new types of music,” and home at times for both Riley and Reich.<sup>2</sup> Ligeti acknowledges general similarities between the pattern-changing and phase-shift techniques of Riley and Reich and his methods in *Poème Symphonique* and *Lontano*, in the form of motivic repetition that resists developmental paradigms. But the American composers’ work remains fundamentally, resolutely Other, having roots in an entirely different cultural background. For instance, the “semblance of infinity” Ligeti finds in Reich’s phase-shifting works bespeaks a meeting of the “Oriental” and “Industrial-Technical,” in a way unique to the United States and especially California in the 1970s: “what emerges is neither oriental nor technical, but the strangely alienated combination of the two worlds.”<sup>3</sup> The watered-down version of this in 1970s American popular culture was “the industrialized myth of a world without industry,” a fantasy in blithe disregard of the grinding wheels of late capitalism.<sup>4</sup>

The culmination of this fantastic communion of hippie bliss and technology for Ligeti seems to be a work that falls between the poles of experimental music and pop: Riley’s “Poppy Nogood and the Phantom Band,” the second work on Riley’s 1969 LP, *A Rainbow in Curved Air*. The Phantom Band is staffed by “ghosts” of the multi-tracked composer, constructed from echoes of repeated, multi-tracked motives which build on one another even as they fade away, in the manner of the Droste chocolate girl, reflected ad infinitum by ever smaller versions of herself (see Figure 1). Out of this *mise en abyme* – in which tape loops play the role of reflective mirrors – appear “secret” modulations which introduce new chords and new tonal spaces with no regard to functional progression. The title of Riley’s subsequent release with John Cale, “The Hall of Mirrors at Versailles”

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<sup>2</sup> “Tendenzen der Neuen Musik,” 456.

<sup>3</sup> “Tendenzen der Neuen Musik,” 458.

<sup>4</sup> “Tendenzen der Neuen Musik,” 459.

from *Church of Anthrax*, seems to acknowledge that Riley's technique and form are one and the same: static, recursive, and external to any tradition but their own.<sup>5</sup>

Figure 1. Droste Chocolate Girl



### A Soul into a Golem

But Ligeti's "minimal" practice, if one could call it that, turns the California experimental relation between technology and cultural appropriation on its

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<sup>5</sup> Terry Riley and John Cale's *Church of Anthrax* featured five tracks, but is remembered primarily for the densely-produced title track, which featured Cale on viola and bass and Riley on organ and saxophone; (Columbia 30131, 1971).

head. Ligeti subsumes various non-Western and extramusical influences within the technology of the work: the techné of his process, its formal ambition, and the sheer physics of the medium for which he writes. Arnold Whittall decries the nakedness of Ligeti's process, the way "grids that underpin and control the music's evolving processes" sit on the surface of his music. For Whittall the mechanical aspect of Ligeti's *Études* represents an almost suffocating confrontation with the kernel of their being: no longer "filtered out," such processes lose their aura and mystique. Whittall longs for a Ligeti who conformed to one camp or the other: the avant-garde or minimalism, more obedient to the master signifiers of our age.<sup>6</sup>

But Ligeti's is a modernist practice for a world overwhelmed by industry and the industrialized, expressed by a fascination with algorithms and "the generation of musical form departing from a conceptual 'genetic code'." In a conversation with Tünde Sitha he maintained, "I don't employ mathematical procedures, algorithms. To me, numbers matter in the way they mattered to Bach [...] or rather, to Obrecht."<sup>7</sup> But with Manfred Stahnke, he compared the composer to the scientist: "A scientist who works in an area that never claims to explain everything."<sup>8</sup> The composer's mid-1960s articles on trends in new music reveal an obsession with both pre-compositional schemes and notational gambits as codes that operate independently and often orthogonally to the music produced. Ligeti wrote often of the completely planned electronic or serial work that did not allow for audio artifacts, internal contradictions, or the vagaries of perception. In

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<sup>6</sup> Arnold Whittall, "In Memoriam: György Ligeti," *Musical Times* 147, no. 1896 (2006): 2–4; 2.

<sup>7</sup> Tünde Szitha, "A Conversation with György Ligeti," *Hungarian Musical Quarterly* 3, no. 1 (1992): 13–17; 17.

<sup>8</sup> "György Ligeti und Manfred Stahnke: Gespräch am 29. Mai 1993," in *Music und. Band 2: Musik – nicht ohne Worte. Beiträge zu aktuellen Fragen aus Komposition, Musiktheorie und Musikwissenschaft*, ed. Manfred Stahnke, 121–52 (Hamburg: von Bockel, 2000), 123.

mistaking artistic work with bookkeeping, the composer must inject her invention into a prepared organization, “as a soul into the golem.”<sup>9</sup>

I generalize this compositional attitude as a “code system,” or use of an algorithmic process with an audible output. Whether that process manifests as a formal rhythmic, melodic or harmonic structure, or remains implicit, this fraught relation between the technology of the algorithm and its execution forms a central tenet of Ligeti’s aesthetics. These algorithmic relationships obtain among processes, notations, and performance practices, but fall into two kinds. In the first category are determinate codes which appear to exhaust themselves as they follow an audible process to its end: process music that pointedly reflects on its own process.

This category includes the early *Polyphonic etude* for two pianos, *Invention*, and *Ricercare per organ*, the latter two witty historical pastiches based on thoroughly modern chromatic subjects. The *Passacaglia ungherese* from 1978 is a particularly rich example of such a process piece. Written for a harpsichord tuned to mean-tone temperament, it boasts a recursive algorithm: a two-bar canon produces an interval cycle composed entirely of major thirds and minor sixths that includes all twelve tones. This cycle repeats at the unison, then the lower octave, spiraling to the bottom of the keyboard and up again to high C every six cycles. Since only those intervals in the proportion 5:4 – the passacaglia cycle – are in tune, they clash with the primarily stepwise melody, which in good Baroque fashion moves proportionally from quarter-notes to eighths and sixteenths, to end in a mock fourth species counterpoint, as shown in Figure 2.

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<sup>9</sup> György Ligeti, “Kompositorische Tendenzin heute,” first published as “Aktuelle kompositionstendenser,” trans. Bo Alphonse, *Nutida musik* 3 (1960/61): 2–4; reprinted in *Gesammelte Schriften*, 1:112–16; 1:112.

**Figure 2. *Passacaglia ungherese*, first registral cycle: 16-tone canon (or, alternately, 8-note subject, followed by 8-note countersubject)**

The musical score is presented in three systems, each with a treble and bass clef staff.   
 System 1 (measures 1-16): The right hand plays a melodic line starting with a quarter note (1), followed by eighth notes (2, 3, 4), quarter notes (5, 6, 7, 8), and quarter notes (9, 10, 11, 12). The left hand provides harmonic support with chords.   
 System 2 (measures 6-16): This system continues the melodic and harmonic development. The right hand features more complex rhythmic figures, including sixteenth notes and slurs.   
 System 3 (measures 11-16): The final system shows further rhythmic complexity, with overlapping patterns between the hands.   
 Labels above the staves indicate 'Subject' for the first system, and 'Interval cycle 1', 'Interval cycle 2', and 'Interval cycle 3' for the subsequent systems. Measure numbers are placed below the notes to indicate their positions within the cycle.

“Fém,” No. 8 from the second book is Ligeti’s clearest example of this model among the *Études* for Piano. The subject of “Fém” is an alternating West African “bell pattern” that expresses asymmetrically-divided patterns of eighteen beats in the right hand and sixteen beats in the left in the proportion 9:8, to form a larger macroperiod every thirteen bars. Yet this process is neither as audible nor as explicit as in the earlier works; rhythmic patterns are overlaid and “amplified,” to reach a maximum of density and volume in cycle 30 before returning to the original isorhythm. The coda interrupts both patterns mid-cycle to shift from an eighth to a dotted quarter-note pulse, exposing a hidden call and response pattern between hands that comes to rest in perfect synchrony (see Figure 3).

Figure 3. “Fém,” first macroperiod bb. 1–12: 18-beat talea in r.h., 16-beat talea in l.h.

The image displays a musical score for the first macroperiod (measures 1-12) of the piece "Fém" by György Ligeti. The score is written in 12/8 time and is divided into three systems. Each system contains two staves: the upper staff is for the right hand (r.h.) and the lower staff is for the left hand (l.h.). The r.h. part has an 18-beat talea, and the l.h. part has a 16-beat talea. The music consists of rhythmic patterns of eighth and sixteenth notes with rests. The first system covers measures 1-4, the second system covers measures 5-8, and the third system covers measures 9-12. The score ends with a double bar line.

Ligeti’s lean, economical *Ricercar*, the *Passacaglia ungherese*, and “Fém” expose their founding premise, yet thwart our expectations of a conventional denouement. Rather than accelerating towards a heady climax or a majestic ritardando, they slowly grind to a halt, like a precision mechanism breaking down.

### The Ghost in the Machine

This brings me to my second category, apparently determinate codes – often derived from traditional musical categories – which, despite their regulative function, lead to surprising, musically unpredictable results. The most notorious examples of this formal relationship are the so-called microcanonic works, but this code-correspondence populates every genre, and the degree of deviation from the founding premise varies greatly from

piece to piece. I return to the 1960s and Ligeti's published articles and lectures, to unearth support for his use of both notation and performance practice as codes that operate independently and often orthogonally to the music they produced and its aural effect.

At the beginning of his 1964 Darmstadt lecture "New notation – means of communication or an end in itself?" Ligeti stressed that "or an end in itself?" works equally as a title: the relation between instructional code and its result is a matter of context, perspective, and scale.<sup>10</sup> Four years earlier he had premiered *Volumina*, his only score composed in graphic notation. But according to the composer, *Volumina* "has, in fact, nothing to do with graphic notation."<sup>11</sup> In "New notation" Ligeti had drawn a line between true musical notation and musical graphics. The former functions as a highly economic, quasi-deterministic code, whose utility derives from a high degree of redundancy. Musical graphics, on the other hand, oversignify; they exist as maps richer in implication than any one musical path derived from them. But *Volumina's* graphics paradoxically offer a precise correspondence between the physical actions of the performer and the registral limits of clusters, allowing the performer what Ligeti called "a kind of rubato both in time and space."<sup>12</sup>

*Volumina* broke barriers in its performance practice as well. With the aid of Karl-Erik Welin and Bengt Hambraeus, Ligeti fashioned a kind of inverted shadow narrative of the instrument's history, where sudden, sweeping movements of hands and limbs replace the control and decorum

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<sup>10</sup> György Ligeti, "Neue Notation – Kommunikationsmittel oder Selbstzweck?," *Notation Neuer Musik (Darmstädter Beiträge zur Neuen Musik 9)*, ed. Ernst Thomas (Mainz: Schott, 1965): 35–50; reprinted in *Gesammelte Schriften*, 1:170–84.

<sup>11</sup> György Ligeti, *Ligeti in Conversation with Péter Várnai, Josef Häusler, Claude Samuel and Himself*, trans. Gabor J. Schabert, Sarah E. Soulsby, Terence Kilmartin and Geoffrey Skelton (London: Eulenburg, 1983), 95.

<sup>12</sup> *Ligeti in Conversation*, 40.

of historic performance.<sup>13</sup> One or two additional performers as registrants were now required, part of a dramatic choreography that involved control over all stops, manuals, keys and pedals as well as a written in lack of control over timbres which resulted from the use of half-stops and de-winding the organ. I cite here an especially telling clip on YouTube, which shows Dominic Susteck trying heroically to tackle registration and performance duties.<sup>14</sup>

Ligeti's 1968 talk for the Walcker organ symposium described a utopian future organ, expanded and altered to allow the composer unheard of flexibility, while still retaining the organ's identity as "an instrument with pipes to create sound."<sup>15</sup> A contemporary composer's experience with electronic music and *musique concrète* should lead to experimental approaches to the organ, as did the fantastic machines of Athanasius Kircher's 1650 *Musurgia universalis*. Since the organ has *never* kept pace with changing compositional ideas, it provides a model exemplar of the historical tension between new music and practice, a tension which did not release until the infamous premiere of *Volumina* in 1960: a composition expressly written not *for* the organ but *against* it.

One could say the same for the organ etude *Harmonies* from 1967. Unlike *Volumina*, *Harmonies* is written in traditional notation, one of two works Ligeti constructed as a complete mirror canon. It thus seems to fit into the category I labeled "determinate codes": the first ten voices are

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<sup>13</sup> Discussed at length in Martin Herchenröder, "Der Komponist und die Orgel im 21. Jahrhundert," *Die Orgel zwischen Gestern und Morgen*, ed. Hermann J. Busch and Roland Eberlein (Walcker-Stiftung für orgelwissenschaftliche Forschung, 2011).

<sup>14</sup> The Dominck Susteck clip can be viewed at <https://www.youtube.com/watch?v=qazu-LqYJow>, accessed 23 Feb. 2020.

<sup>15</sup> György Ligeti, "Was erwartet der Komponist der Gegenwart von der Orgel?," first published in *Orgel und Orgelmusik heute. Versuch einer Analyse*, ed. Hans Heinrich Eggebrecht (Stuttgart: Musikwissenschaftliche Verlags-Gesellschaft, 1968), 168–83; reprinted in *Gesammelte Schriften*, 1:217–30; 1:223.



introduced in an ordered series, with the mirror symmetry of its canons complemented by the physical movements of the player, whose shifts in fingering and hand position parallel the voice-leading, as indicated by Figure 4. Yet the organist is directed to avoid any impression of meter or periodicity, to maintain soft to “very soft” dynamics, and to strive for “pale, strange vitiated colors” through the use of reduced wind pressure, half-stops of partially-depressed keys and the aid of a registrant.

**Figure 4.** *Harmonies*, serial introduction of voices, bb. 1–13, above; pattern of mirror canon in all 10 voices, below

The figure displays two musical staves for the organ. The upper staff shows the serial introduction of voices, with measures 1 through 6. The lower staff shows the pattern of mirror canon in all 10 voices, with measures 7 through 12. The notation is complex, featuring dense chords and intricate voice-leading. Below the staves is a colorful graphic representation of the mirror canon pattern, showing the relationship between the 10 voices across the measures.

The otherworldly sound that results often bears no audible relation to *Harmonies'* intricate pitch design, or to the physical demands of its performance. Ligeti called *Harmonies* an “artistic use of disease,” and was known to intervene in coachings if he thought it did not sound “consumptive” enough. Hence a performances in which one can hear the

contrapuntal voice-leading and match its resulting sounds to the performer's gestures – one out of the nine recorded performances I surveyed – must be termed a failure, a performance that fails to fail, as it were, performing a sacred facsimile of an etude intended as a profane shadow of its kind.

My final example of an algorithmic work with a covert, inexplicable relationship between process and sounding result is the contrapuntal subject that constitutes *Vertige*, the ninth piano Étude from the second book. The dedication of *Vertige*, to Mauricio Kagel, gives some idea of its precarious nature: when Pierre-Laurent Aimard couldn't prepare it in time, *Vertige* was premiered in a player piano version arranged by Jürgen Hocker. Its premiere befit the most blatant homage, of many in Ligeti's oeuvre, to the Shepard's scale phenomenon associated with computer music, wherein a descending chromatic scale replicated at the octave is perceived as a single line in eternal descent (1964). Not surprisingly Michael Weber's spectrograph of Volker Banfield's performance reveals that its subtle dynamic shadings "correspond almost entirely to the model of Shepard's scale."<sup>16</sup>

Quite apart from its attempt to model a computer-generated acoustic illusion, *Vertige* represents an idealized fractal structure: a synoptic analysis indicates the harmonic and temporal intervals of the first six bars and eight voices of the printed score; dotted lines show the continuation of descending lines as they cross staves from upper to lower. The descending 16-note chromatic subject repeats four times as a canon at the unison. Its interval of imitation varies, correlating with the mathematical sequence  $7n+1$  (where  $n$  = a non-zero integer: 8, 15, 22), but soon diverges from a periodic

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<sup>16</sup> See the photo that accompanies Michael A. Weber, "Towards Interpretation," *Systematische Musikwissenschaft* 2/2 (1994): 273–94.



The sociologist of play Roger Caillois divided all human games and play into four categories, one of which he termed *ilinx*, games based on the pursuit of vertigo, “an attempt to momentarily destroy the stability of perception and inflict a kind of voluptuous panic upon an otherwise lucid mind.”<sup>17</sup> The title of *Vertige* indexes this affective content, the “constant sliding and collapsing” that limns a musical portrait of anxiety.<sup>18</sup> The rhetorical concision of the term *vertigo* points to the condition of both the listener – disoriented in registral and pitch space – and the performer – struggling to maintain an inhuman evenness of tone and speed at low volume across shifting registers and hand positions. More than a mere registral illusion, the ceaselessly-descending eighths of *Vertige* are intended to melt into one another: to efface the identity of the piano as a percussion instrument, and to disguise the partitioning of pitch space into twelve notes per octave. The isorhythmic structure of *Vertige* adds an additional layer of irony by emphasizing buoyant E major harmonies over a dominant B pedal, to lend the work what Manfred Stahnke called “a California pop sound.”<sup>19</sup>

For the pianist Pierre-Laurent Aimard, who worked closely with the composer, the transformation of a simple chromatic kernel from corporal sensation to acousmatic signifier in *Vertige* contains a “pathological” dimension:

In your physical memory, you feel the gesture of the chromatic scale, but because Ligeti uses it as an ostinato, quickly and continually repeating itself, this creates another physical feeling altogether. You feel a transformation of this memory. Acoustically, at the beginning, you hear the

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<sup>17</sup> Roger Caillois, *Man, Play and Games*, trans. Meyer Barash (Urbana: University of Illinois Press, 1961 / 2001), 24.

<sup>18</sup> György Ligeti, “Etudes – Deuxieme livre. Notizen zu einzelnen Etüden,” in *Gesammelte Schriften*, 2:293–95; 2:293.

<sup>19</sup> Manfred Stahnke, “György Ligeti und Manfred Stahnke: Gespräch am 29. Mai 1993,” 138.

chromatic scale, like Escher's perpetual waterfall. Then, it drowns on itself until you can no longer hear the chromatic scale, though you continue to feel it in your fingers. Ligeti disconnects the acoustical effect from the gestural, creating a brilliant illusion of perception. In fact, he is organizing a schizophrenia.<sup>20</sup>

The free-floating anxiety of *Vertige* reveals an existential dread that lies behind the placid façade of American minimalism, that “strangely alienated combination” that would mask the “voluptuous panic” behind the hall of mirrors. As in all the works cited above, the algorithmic codes of *Vertige* host a ghost in the machine, some error that grants the work a spectral life and expression beyond its programming. Hence the arbitrary pitch series in *Harmonies* takes a circuitous route to its registration in order to generate a vast, unregulated soundworld, while a specular spectral and temporal uniformity reigns across all six recorded versions of *Volumina* I surveyed.<sup>21</sup>

Unlike those processes that control the early music of Reich and Riley, Ligeti's algorithmic constraints are neither subsumed by nor equal to their form; repetition and recursion never represent a simple Droste effect. The re-inscription of codes and canons – in the largest sense –

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<sup>20</sup> Pierre-Laurent Aimard, in Claire Sykes and Pierre-Laurent Aimard, “Fortes, Fractals, and Finger-Busters,” *Piano & Keyboard* 196 (2007): 30–34; 34.

<sup>21</sup> The program Sonic Visualizer (Queens University, London) was employed to produce spectrograms of the following full performances: *Volumina*, original version (1960–1961), Karl-Erik Welin, recorded March 1962, Stockholm, St. John and Gustav Vasa, on *Ligeti: Continuum, 10 Stücke F. Bläser, Artikulation, Glissandi, Orgel Etuden, Volumina*, WERGO 60161-50 (1988) and Gerd Zacher, 1968, Berlin, Kaiser-Wilhelm Gedächtniskirche, *Varèse-Penderecki-Ligeti Collection VOXBOX CDX 5142* (1995). *Volumina*, revised version (1968), Gerd Zacher, 1968, Hamburg-Wellingsbüttel, Lutherskirche, *Gerd Zacher Mauricio Kagel / Juan Allende-Blin / György Ligeti*, Deutsche Gramophon 105 990 (1968); Hans-Ola Ericsson, 1991, Grönland organ Luleå Cathedral, Schoenberg, *Frescobaldi, Ligeti, Bis* CD 509 (1997); Zsigmond Szarthmary, 1995, Offen, St. Martin Church, *Ligeti Edition 6: Keyboard Works*, Sony SK 62307 (1997); and Domink Susteck, 2012, Cologne, Kunst-Station Sankt Peter, *Ligeti: Volumina – Orgelwerke*, Wergo WER 6747 (2013).

expresses the irreducible gap between technology and orientalism, the incorporated sign and its meaning: the failure of the bad infinity that disguises its failures. As Ligeti said of the paradox posed by the “consumptive” Harmonies, such a “beautiful disease” may point the way towards a new praxis.<sup>22</sup>

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<sup>22</sup> György Ligeti, “Was erwartet der Komponist der Gegenwart von der Orgel?“, 219.