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Scoring the Unknown: Rethinking Fixity and Openness in Western Art Music Notation

DISSERTATION

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DOCTOR OF PHILOSOPHY

in Integrated Composition, Improvisation and Technology

by

Isaac Otto Hayes

Dissertation Committee:
Professor Mari Kimura, Chair
Professor Amy Bauer
Professor Michael Dessen

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DEDICATION

To my mother and father.

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VITA

Isaac Otto Hayes

EDUCATION

Doctor of Philosophy in
Integrated Composition, Improvisation and Technology **2023**
University of California, Irvine *Irvine, CA*

Master of Fine Arts in Music Performance and Literature **2018**
Mills College *Oakland, CA*

Bachelor of Arts in Psychology and Philosophy **2012**
University of Arkansas *Fayetteville, AR*

TEACHING EXPERIENCE

Instructor of Record **2023**
Teaching Assistant **2020–2023**
University of California, Irvine *Irvine, CA*

ABSTRACT OF THE DISSERTATION

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Isaac Otto Hayes

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Professor Mari Kimura, Chair

To date, there exists a startling lack of scholarly literature which attempts to systematically address novel notations for improvisers—particularly instances centering syntactically- and semantically- well-defined symbols. This lack of attention may be attributed, at least partially, to unclear definitions at the heart of the discourse and the lack of a rigorous typology of music notations generally. This dissertation, via a multi-pronged strategy, takes steps toward filling this lacuna. Chapter One provides a historical gloss grounding twentieth- and twenty-first century performer/notation interaction in much earlier models, locating Western notation's fixity and openness as core sites of musico-technological innovation. In the process, the chapter highlights pivotal signposts in Western notation which mark important paradigm shifts in these conceptual categories. Chapter Two articulates a clear philosophical position with regard to notational semantic content, "fixed" and "open" notation, and the notion of the open score as first posed in the 1950s and '60s, challenging the conceits of the prevailing "folk semiosis" of music notation in order to begin developing a more analytically useful notation typology. To this end, the chapter examines essays by Umberto Eco and Pierre Boulez, along with György Ligeti's „Neue Notation: Kommunikationsmittel oder Selbstzweck?"—by far the most lucid attempt to formulate such a typology. Chapter Three deploys concepts solidified in the previous chapter in service of a notation-centric analysis of two late-century work complexes: Anthony Braxton's *Composition No. 76* and Horațiu

Rădulescu's *Das Andere*/Op. 89 (*"Before the Universe was Born"*). Interrogating these works' related-but-disparate notation schemes grants new insights into notation's ability to mediate performer/composer agencies and to uniquely reflect composers' communities of practice and philosophical/aesthetic commitments. Finally, Chapter Four thoroughly documents the author's efforts to develop and deploy a novel notation scheme for improvising musicians. This includes a discussion of several aspects of the design and preliminary implementation of {O-G} notation as well as of its use in a series of creative works intended to demonstrate its range and flexibility. This is followed by a frank assessment of the extent to which it was capable of fulfilling the author's initial desiderata and subsequent design criteria.

INTRODUCTION

Western music notation is overencumbered. Having served as a *lingua franca* for so many musical practices over the last millennium, it has been pressed into service in a great many capacities which often functionally conflict with one another. For the "classical" musician, notation must behave as a recipe to be more-or-less strictly obeyed according to a composer's (real or imagined) wishes. For the analyst, it must stand in logical, well-structured relationships that remain stable from piece to piece such that patterns may be observed and conclusions drawn. For the transcriber, it must map one-to-one with observed sonic phenomena; able to represent minute sonic details well enough to be fit for archiving or reproduction. Conversely, for the improviser it must remain usefully vague, serving to induce musical invention by providing a material springboard for creativity.

Given these requirements, Western notation has proven admirably metastatic—able to be augmented, pared down, or redefined according to the needs of its adoptive community of practice. When medieval scholar-clergy needed a new way of transmitting and archiving sacred melodies, notation was altered such that it might serve as a fixed point of reference, supplanting earlier, vaguer neumes. When improvised accompaniment became *de rigueur* for Baroque soloists, the music's composers, arrangers, and engravers developed new symbols to clarify music's harmonic underpinnings. Then, when improvisation subsequently fell out of vogue, new symbols allowed players to more closely track composers' pre-conceived sound-concepts.

This notational malleability held as much for the bleeding-edge modernism of the twentieth century as it had in earlier eras. The 1950s and 1960s exploded with novel notation schemes—some short lived and some more durable. Though their invention and implementation were motivated by a number of factors, the majority of new notations, it seems, arose from composers' desire for some form of sonic indeterminacy—for scores which would yield unique listening experiences each time they were realized. In a sense, this was the same as any earlier innovation: artists discovered a need and developed new technology to fill it. The kernel of difference lay in the unprecedented extent to which the notation *itself* became a

vector for artistic expression. Composers, it seems, had grown increasingly concerned with its power not only to realize a particular sound-world, but to mediate player/author/score interactions as well. As a result, these twentieth-century notations prove fertile ground for new scholarship—not only on their own merits, but because of their potential to grant insight into literate music-making at large.

As a composer-improviser with an atypically tortuous relationship to jazz and contemporary Western concert music, I took particular interest in the notation practices situated nearest the juncture between these two fields, those of the AACM (particularly those of Anthony Braxton, my old mentor Roscoe Mitchell, Wadada Leo Smith, and George Lewis). Familiarizing myself with these composers, in turn, necessarily led to greater awareness of their European and American "concert music" peers and forebears: artists in the New York School (John Cage, Earle Brown, Christian Wolff, Morton Feldman) and the titans of Euro-modernism (Karlheinz Stockhausen, György Ligeti, Helmut Lachenmann, Horațiu Rădulescu, to name a few.)

As the purview of my research expanded, so, too, did my interest not only in these enigmatic symbols themselves, but in the motivations that lay behind their deployment Some important questions arose: What factors do composers consider when designing new notations? How does one use notation to balance cogent musical form with an ever-changing sonic surface? What differentiates notations which properly *encode* from those which seek only to effect ekphrasis, a necessarily imperfect translation from one aesthetic domain to another?

Of course, there is no shortage of literature attempting to clarify and contextualize these new practices. Scholars (since at least Umberto Eco) have recognized the novelty and significance of these fundamentally "incomplete" scores which require players' creative contributions in order to be finalized in performance. However, one finds that much of this literature lacks focus and precision. Far more attention seems to be paid to new notations' aesthesis and physical trace than is paid to their function. Many writers attempt to discuss novel notations without a robust notion of what differentiates the new from the old, and

without a unifying narrative able to account for the ways openness has *always* been a part of notation's function and use. Further, writers routinely conflate composers' underlying philosophical commitments with the tools they use to inscribe their music. Thus categories of notation are unnecessarily multiplied: "aleatoric notation," "indeterminate notation," "improvisatory notation," and worst of all, the ultra-vague "graphic notation," all of which lack unambiguous definitions that would distinguish them from earlier forms and from one another. As I see it, these issues point to a marked lack of conceptual rigidity and descriptive language when it comes to notation's use and function, particularly as regards complex, late-century "open" notation schemes.

This dissertation is thus an attempt to address, in part, lacunae in the study of these "open notations," i.e., of notations oriented toward finer mediation of sonic indeterminacy. To be more specific, my interest principally lies in notations which center syntactically and semantically well-defined symbols, as these seem to frequently take a backseat (in practice and in the literature) to more "radical" methods which deliberately strip away notation's syntax and semantics, granting the performer so much agency that the composer's contributions become practically negligible.[1] I contend that systems which instead *build upon* the strengths of traditional notation, deliberately amplifying its ability to mediate composer/performer relationships have the most to tell us about the way we interact with the score. Thus, over the course of this document I explore a number of these systems via a multi-pronged approach.

Chapter One conducts a rapid historical survey, developing a narrative which locates notational fixity and openness as core sites of innovation in Western art music notation. Beginning with Guido d'Arezzo and ending in the 1960s, I portray the history of Western notation as a gradual ebb and flow in the degree of coupling between the printed page and its sonic products. Specifically, I note the way that the form and function of notation have always responded to the particular needs of its user-base, though, crucially, that form and function are not always neatly tied together. Where significant advances in either occur, I examine

1. ...though to be clear these "asemantic" scores, too, deserve greater scrutiny.

specific instances where this change is made manifest, which range from the development of *cantare super librum* (which I take to be one of the earliest modern literate/improvisatory practices), to the decline of notation's "openness" in the late-eighteenth and nineteenth centuries, to the Afro-diasporic return to notation for improvisers in the mid-twentieth. In addition, I briefly examine some of the first (predominantly New York School) forays into the new notations at the heart of this assessment. Here I render notational openness and fixity as first emergent and later deliberately exploited musical parameters, always already linked to the very notion of notated music.

Chapter Two uses concepts explored in the first chapter to examine several aspects of notation's function in detail, ultimately taking steps toward a more robust typology of (open) notations Beginning from first principles, I pose a new model by which we might conceive of notation's semantic content—i.e., what these symbols represent and how they convey their message. So as to facilitate the development of a more useful critical lexicon, I challenge what I take to be the prevailing (often insufficiently-articulated) "folk-semiosis" pertaining to the function of music notation generally. Following this, I examine essays by three authors, Umberto Eco, Pierre Boulez, and György Ligeti (all roughly contemporary with the mid-century notation boom), who each seek to address the roles and goals of various open notations. In particular, I spend significant time on Ligeti's 1965 „Neue Notation: Kommunikationsmittel oder Selbstzweck?," a woefully under-appreciated essay in which Ligeti, a scholar-composer situated at the bleeding edge of Western concert music innovation, lends unique perspective to questions of notation's function. Most importantly, Ligeti examines a number of contemporary neonotational works and, in so doing, puts forward a new typology so as to accommodate these new pieces. Finally, based on these insights I propose two new descriptors, "traversal" and "hybridity," used to describe the ways composers combine and move through notations at varying degrees of fixity and with varying levels of semanticity.

Chapter Three demonstrates an application of this new descriptive paradigm, examining two "work complexes" by late-century composers Anthony Braxton and Horațiu Rădulescu

through the lens of a modified Ligetian typology. Braxton and Rădulescu, two innovators belonging to very different communities of musical practice, each employ complex, bespoke notation schemes which, to speak broadly, deliberately parametrize notational fixity and openness in various ways. Here, I attempt to lead by example, conducting a notation-centric analysis comparing the two composers' systems on a symbol-for-symbol basis and describing what I take to be the most salient points of overlap and departure between them. Through this analysis, I draw conclusions pertaining not only to Braxton's and Rădulescu's writing methods, but also to their underlying philosophical commitments and to the unexamined potential of well-defined "open" notations generally.

Finally, Chapter Four serves to document the author's yearslong creative investigation of the topics explored in previous chapters; specifically, the design and implementation of {O-G} ("Otto-Glyphs") a novel notation scheme for improvising musicians. I begin by discussing the system's initial catalysts: dissatisfaction with some of my formative experiences with scored improvisation and my subsequent exposure to a number of artists who had succeeded in creatively circumventing these same problems. I continue by summarizing {O-G}'s nascence, addressing a number of important milestones including the first piece to be formally composed in the scheme as well as the formal "instruction manual" which eventually became the core tool by which I inducted new players into the system. The system (and my pedagogical method) would ultimately be put to the test in *I Die Each Time I Hear the Sound*, a concert of original works composed either entirely in {O-G} or with well-integrated {O-G}/traditional notation. I thus conclude by summarizing several of the more noteworthy compositions from this series before conducting a broad-level assessment of {O-G}'s successes and failures according to the criteria delineated at the project's outset.

CHAPTER 1

OPENNESS AS EMERGENT PERFORMANCE MEDIATOR IN WESTERN MUSIC NOTATION

> "We are still in the era of Guido, since apart from minor variants in notation and didactics his system has been maintained up to the present day."
>
> Jos. Smits van Waesberghe, 1951.

Just as the dual traditions of musical literacy and o/aurality have coexisted in Western art music since the genesis of score-making, so too have degrees of notational fixity and openness.[1] All musical traditions develop, thrive, and are passed down only by dint of some degree of material fixity which persists from performance to performance. Likewise all performance-oriented traditions are kept alive by virtue of some degree of in-the-moment spontaneity, some variability or incompleteness, which renders each instance of the tradition unique. This dual nature existed, of course, long before printed music did. Though we lack insight into, for instance, the precise nature of ancient Greek *kithara* music, we may rest assured that its associated practice necessarily involved degrees of both constancy and indeterminacy. With the introduction of more thoroughly conveyable/reproducible (and crucially *durable*) musical artifacts in the form of Guidonian notation, however, a fascinating new layer of complexity emerges. Thanks precisely to the durability of these "scores" and their many, many descendants, we are now able to peer backward into what is essentially the whole of the Western art music tradition—enabling us to piece together a narrative which demonstrates the ever-changing impact scored materials have had on the aesthetics and structures of agency of our music-making.[2]

To be clear, this chapter does not seek to perform an exhaustive reckoning of the varying modes of improvisatory practice in Western art music. Rather, in order to pave the way for the overarching goal of this document—a more nuanced analysis of the *intentionally*-open notation-mediated practices of the twentieth and twenty-first centuries—this chapter will

1. For clarity: I will use the term "score" here in a general sense to refer to any printed form of music notation (rather than in its more specific definition as a drawing together of distinct *parts* which together comprise a document for conducting, analysis or perusal).

2. That we broadly consider "the tradition" itself to essentially begin with the dawn of scoring practices itself speaks volumes!

examine a number of score-oriented "case-studies" which will lend clarity to our unique position at the tail-end of 1000+ years of this symbiotic oral/literary meta-tradition.

After outlining some much-needed provisional definitions, this chapter will examine (chronologically) exemplars from what I take to be key models along the long historical arc of our relationship to notational fixity—specifically: (1) the medieval, (2) Renaissance, (3) romantic, (4) Afro-diasporic, and (5) postwar models. Only after this short survey will we have the tools needed to elucidate the post-1970 models of musical openness which ultimately concern us.

1.1 What is a notation?

First, though, it is of the utmost importance that we arrive at a few working definitions. I have thus far used the term "score" rather loosely to refer to any durable arrangement of symbols which somehow permit the recollection or performance of a musical work—in contravention, perhaps, of the typical way we imagine a score: a rather rigorous, precise accounting of pitch, rhythm, tempo, timbre, indeed any and all parameters necessary for an accurate rendition of a finished piece of music. Of course, what exactly constitutes "rigor," "precision," and indeed "finished" when it comes to a musical work is entirely historically contingent—one of the main thrusts of this chapter. Thus a satisfactory definition should permit some wiggle room as regards these traits.

I find virtuoso violinist and scholar Mieko Kanno's definition of (classical) music notation to be particularly eloquent and inclusive:

> Musical notation in western classical music is a system which preserves past musical events while enabling and informing future ones, both describing musical works and giving specific instructions for them to be realized [...] In general, in classical music, notation is considered to be as important—if not more important than—performance and recording, in learning what we consider to be the essence of a musical work.[3]

3. Mieko Kanno, "Prescriptive notation: Limits and challenges," *Contemporary Music Review* 26, no. 2 (April 2007): 231–254, ISSN: 0749-4467, https://doi.org/10.1080/07494460701250890.

Though the scope of Kanno's article is limited to a rather narrow subset of scoring practices, namely those pertaining to twentieth-century classical music, her definition surely remains relevant to a broad range of musical paradigms. Notation, as Kanno describes it here, may serve as an archival aid, as a means of jotting down sketches, as an analytic tool, as a necessary precursor to performance, etc.—qualities which remain constant over the entire historical lifespan of the practice. Even more pithily, Floris Schuiling (to whose incisive paper I will return in a future section) defines a notation—sans qualification—as simply an "[interface] for imagining virtual musical relations," notably omitting any reference to actually-existing materials referenced *by* notation past or present. In some respects this is the safer choice insofar as we'll later encounter notations which stretch Kanno's interpretation of the term, but for the moment I'll split the difference with the following definition:

> A *music notation* consists of a coherent set of symbols oriented toward an existing (i.e. past or present) or virtual (i.e. potential future) musical product—sounds organized in time. These symbols, taken together permit or facilitate the recording, analysis, or performance of such products.

Chapter 2 will require some additional refinement of this definition, but for now it will suffice to take us through commonly-understood structures of notation.

What, then, of this hugely important discrepancy between the "fixed" and the "open" in music? In Chapter 2 we will look in some detail at Umberto Eco's seminal essay collection *The Open Work* (from whence we get the term). However, for the moment let us consider some instance of musical notation to be "open" to the extent that some parameter or parameters remain variable from performance to performance. For instance: the excerpt for keyboard shown in Figure 1.1, a snippet of a seventeenth-century *prélude non mesuré*, is (relatively) *fixed* with regard to pitch content but remains *open* with regard to duration, rhythm, tempo, attack, etc.[4] The pitches provided present a non-negotiable skeletal framework for performance, the absence of which would render a given realization imprecise or unfaithful. The parameters left open, however, are subject to change from performance to performance, determined

4. "Relatively fixed," that is, bracketing issues of temperament, central pitch frequency, etc.

by factors such as prevailing notions of "good taste," the performer's musical education or creative will, etc.—factors which will change depending on the cultural conditions surrounding music-making in a given time/place.

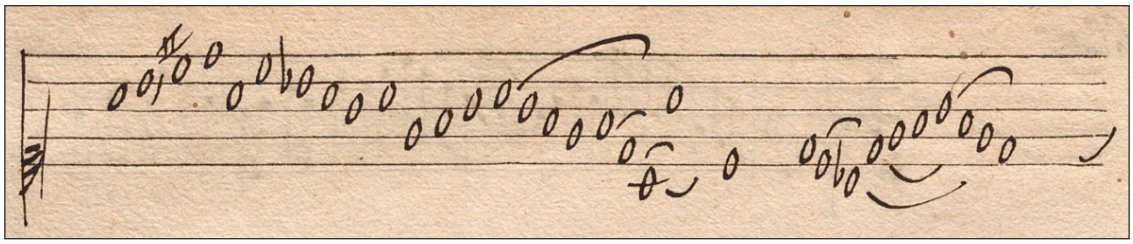


Figure 1.1: An excerpt from one of Jean Henry D'Anglebert's seventeenth-century unmeasured preludes using the "whole note" glyph to represent each pitch ametrically.[5]

Thus, our second working definition:

> An *"open" notation* is any notation which requires active creative (i.e. generative) participation on the part of an interpreter to faithfully render the musical product toward which it is oriented.

Note that this is *not* to say that these open parameters were, in the seventeenth century, fully unbounded and that any interpretation would suffice, so long as it heeded the aforementioned fixed elements. Rather, "openness" in the most generic sense merely points to some degree of indefiniteness or "incompleteness" as regards what music, precisely, is represented on the page. Thus, crucially, under this view *every* music notation designed for human interpretation is, in a non-trivial sense, open to some degree. Even the most seemingly stringent and exquisitely detailed forms of notation we find used by the likes of Brian Ferneyhough or Michael Finnissey necessarily leave key aspects of performance up to the taste and experience of the performer.

Ian Pace, in his contribution to *Unfolding Time* (2009), reinforces this notion via his "negativistic" account of music notation.

5. David Chung, "Transcribing Couperin's Preludes à la D'Anglebert: a Journey into the Creative Processes of the 17th-century Quasi-improvisatory Tradition", *Music & Practice* 5 (2019), ISSN: 1893-9562, https://www.musicandpractice.org/volume-5/transcribing-couperins-preludes-a-la-danglebert/.

> [The historical construct of music notation *in toto*] is, to my mind, founded upon an essentially *positivistic* view of the role of notation. By this I mean the notion that the score tells the performer in essence *what* to do, around which he can elaborate [...] depending on the degree of notational exactitude. The alternative model I wish to propose draws upon structuralist thinking about language; instead of seeing the score in a *prescriptive sense* [...] I would suggest that instead it delineates the range of possible performance activities by telling the performer what *not* to do. [...]
>
> [I]f a performer thinks of notation in this way, the task becomes less one of playing something 'right' as playing it 'not wrong'.

In short, the boundaries notation imposes on performance are in fact broad zones of exclusion. Per Pace's example, the triplets in Chopin's *Impromptu in G♭*, Op. 51 are fundamentally open in the sense that they permit any interpretation not excluded by their "triplet-ness." Only if a performance departs so greatly from the printed page that the gesture is heard as an entirely different metric grouping does it qualify as unfaithful or "incorrect"—thus, for Pace, a less detailed notation is a more open notation on account of forbidding fewer interpretations.[6] Crucially, though, there is no point of maximum fixity at which *all interpretations but one* are forbidden; ergo, it is possible to meaningfully describe any notation as occupying some point along this axis.

For the purposes of this chapter, I'll dub the entire range from some purely theoretical fully-fixed, wholly representative notation to an equally hypothetical fully-open notation the "fixity gradient." While each notation practice examined here will demonstrate fixity/openness in different ways and to different ends, this "gradient" might serve as a helpful (if reductive) analytic tool to facilitate greater insights into the way various notations mediate musical performance.

6. Ian Pace, "Notation, Time and the Performer's Relationship to the Score in Contemporary Music", ed. D. Crispin (Leuven University Press, 2009), 154–6, ISBN: 978-90-5867-735-8, http://upers.kuleuven.be/en/book/9789058677358.

1.2 Notation as archive: Guido d'Arezzo's new fixity

We now largely conceive of liturgical notation in medieval Europe as gradually congealing into the four-line-staff form put forward by Guido d'Arezzo in the eleventh century, having originated in pitchless neumes which offered to the cantor only a general notion of melodic contour and syllabic stress.[7] While Guido was not the first to take a stab at more precisely encoding sacred melodies using "heighted" tones oriented around a central pitch (a practice which, in some form or another, dates at least as far back as Boethius and the ancient Greeks before him[8]), Guido's four-line staff facilitated melodic acquisition by allowing singers to more easily visualize the various intervals to be sung and to determine the chant's "home" hexachord.[9] Figure 1.2 shows one of a number of techniques Guido demonstrates in the *Micrologus* which more precisely encode melodic contour. While often pitches would be appended to individual syllables, this rendering is looser still in that it gives the cantor no indication of syllabic break-points. The rhythmic indications shown in the inset mensural notation are an anachronistic appendage by a later publisher.

7. Richard Taruskin, *Music from the Earliest Notations to the Sixteenth Century: The Oxford History of Western Music*, Revised ed. edition (New York: Oxford University Press, July 2009), 16, ISBN: 978-0-19-538481-9.

8. Ibid., 17.

9. Anna Reisenweaver, "Guido of Arezzo and His Influence on Music Learning," *Musical Offerings* 3, no. 1 (January 2012): 53, ISSN: 2167-3799, https://doi.org/10.15385/jmo.2012.3.1.4, https://digitalcommons.cedarville.edu/musicalofferings/vol3/iss1/4.

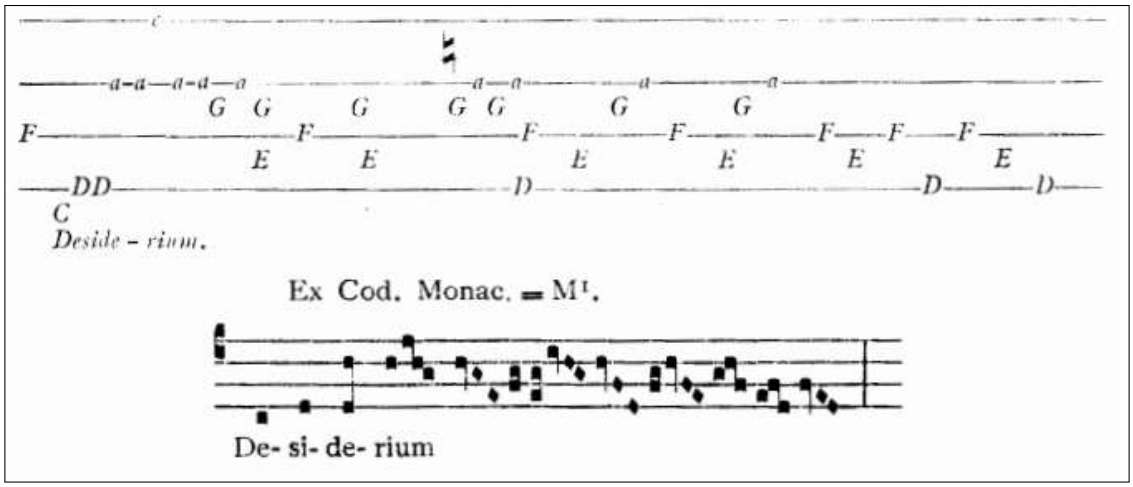


Figure 1.2: A pedagogical excerpt from Guido's *Micrologus* demonstrating the four-line staff with "heighted" neumes—shown here both in Guido's original letter notation (above) and in the later "black note" mensural notation (added in the 1904 Solesmes edition).[10]

Speaking generally, it was a centuries-long yearning for greater notational fixity—a more substantive relationship between sign-system and sound concept—that motivated this shift from pitchless to pitched neumes. Guido's stated goal, that "anyone, with the use of the monochord and with careful instruction in the use of our notes, might, at the end of one month, be in a position to sing songs neither seen nor heard before, on the first glance"[11] arose explicitly in response to a perceived lack of accuracy in the recitation of traditional music, where previously even "a hundred years [of] study of songs"[12] was insufficient to guarantee fidelity among learned singers.

In contrast to prevailing forms of concert music notation today, Guido's appears startlingly vague. His novel system (which would reach maturity in the form of the more complex "black note" mensural notation of the European Renaissance) demonstrates no rhythmic fixity whatsoever, owing, presumably, to the fact that these melodies were necessarily appended

10. Guido d'Arezzo, *Guidonis Monachi Aretini Micrologus [de disciplina artis musicae] ad praestantiores codices mss. exactus* (Desclée, 1904), 28.

11. Leone Bernice La Duke and Guido d'Arezzo, "Micrologus," Accepted: 2009-10-23 (Thesis, University of Oregon, 1943), 16, https://scholarsbank.uoregon.edu/xmlui/handle/1794/9888.

12. Ibid., 17.

to sacred texts which carried with them their own prosodic rhythms. Similarly we find no specifics regarding pace, quality of voice, number of performers, ornamentation, etc. Referring to his treatise (but applying equally to his newly-developed system), he writes: "That which in music is of little significance for the art of singing, or which would not be easily understood I have not held worthy of mention."

The extent to which this system appears "open" by today's standards, though, should not be taken as an indication that its performers were granted a commensurate degree of creative latitude in its realization. Whereas deliberately open notations in the twenty-first century often serve as tacit invitations on behalf of a composer to bend the finished work to the performers will and experience, Guidonian notation was, from the outset intimately bound up with a robust o/aural tradition oriented toward regular, faithful reproduction of comparatively immutable sacred texts. So rigid and commonly-understood was this tradition, apparently, that Guido saw no need to render details of its execution in his notation, save for the melodies themselves which, on account of their prodigious quantity and the difficulty of their memorization, formed the main pedagogical stumbling-block of his project.

Perhaps owing to the notation's aforementioned lack of fixity, regional variation *is* assumed to have cropped up as the new system moved geographically outward.[13] Additionally, the question of varieties of rhythmic interpretation of plainchant melodies is far from settled. Attempts to uncover "*the* authentic rhythm of chant"[14] have largely come up empty, inviting the notion that rhythmic variations between performances formed much of the regional flavor of church music practice. However, this variation clearly arose by virtue of the notation's "technological" limitations and the realities of pre-Enlightenment communication rather than from some desire on the part of the notation's architect(s) to draw out these distinctions. Arguably, the miracle of Guidonian notation and its successors lies in the fact that despite such sparse notation, the genre underwent precious little change (melodically, at least) over

13. Helmut Hucke, "Toward a New Historical View of Gregorian Chant," *Journal of the American Musicological Society* 33, no. 3 (1980): 466, ISSN: 0003-0139, https://doi.org/10.2307/831302.

14. Lance W. Brunner, "The Performance of Plainchant: Some Preliminary Observations of the New Era," *Early Music* 10, no. 3 (1982): 319, ISSN: 0306-1078.

centuries of practice—perhaps, as Helmet Hucke argues, because chant manuscripts quickly became more of a "control against deviation from the true and venerable tradition" than specifically performance or pedagogical aids.[15]

To be clear, neither the fixity of a system of notation nor the historical steadfastness of its resulting melodies preclude creative musicianship via forms of improvisation. *Micrologus*' controversial Chapter XVII takes pains to describe a method by which a student might improvise a new chant on a given text using the structure of its vowel content, gradually presenting the student with more and more melodic liberties as the lesson unfolds. Singers attempting this process are encouraged to "[take] the preferred from the many attempts, [choose] the most pleasing way, [fill] up the cracks, [enlarge] the group, [have] them all moving together [...] so that one gets the most highly unified work possible."[16] Improvisation, for Guido, is not valued for its ability to create *many* valid instances of a work from *one* central score-artifact, but rather its ability to achieve the most euphonous single work via a process of repetition; of trial and error. In a way, this procedure complicates the distinction between "text" and "score" insofar as he purports to be able to unlock melodies already present within the text's syllabic content—thereby rendering each text-sans-melody "always already" a symbolic system pointing toward a fixed sound world. The only distinction between this text-score and notation as traditionally understood is the process by which the sound-world is unlocked: in this case, through the process of improvisation itself.

In sum, Guido's efforts to bring greater fixity to the practice of notating existing liturgical works succeeded beyond what he could have possibly imagined in two ways: first, in that they persist (albeit in a modified form) to this day in the canonical collection of Roman Catholic chants, the *Liber Usualis*, and second, in that they provided the basis for the succeeding thousand years of concert music notation and all variants thereof. Further, despite the appearance (through modern eyes, at least) of a great degree of openness in the earliest ancestors of western notation, the symbols' tethers to a particular sound-concept were really

15. Hucke, "Toward a New Historical View of Gregorian Chant," 448.
16. La Duke and d'Arezzo, "Micrologus (1943)," 70.

rather fixed insofar as they were tightly regulated by a tradition of liturgical practice. As we shall discuss soon, only when musicians begin to make the critical shift from using scores as mnemonic aids and regulatory standards to actual *performance* tools do we begin to see notation's openness mediate musicianship in ways more familiar to the twenty-first-century musician.

1.3 Score-mediation in *cantare super librum*

Insofar as its relationship to notation is concerned, the first major sea-change in Western music arrives only when printed musical materials begin to function not only as archival or pedagogical artifacts but as tools which facilitate performance itself. By the fifteenth century, inscribed musical works now have the ability not only to cement the products of an oral tradition for pedagogy and posterity, but also, increasingly to *liberate* musicians from the onus of memorization; instead directly affording them musical techniques to employ in performance Openness here is still strictly mediated by the vagaries of good taste, tradition, etc., though now there is a new expectation of literacy: namely, that a performer should be able to, in real time, transform some "unfinished" skeletal framework (read: a bare melody of some kind) into a florid "finished" work.

This change—really a very gradual series of non-localized changes—coincides with the growing sense of the independent existence of the musical artwork unto itself: the development of the work-concept. More sophisticated notation, claims Laurenz Lütteken, imparts new stability to canons of musical work, allowing musical practices to develop associated bodies of literature. This consequently permits the rise of the inexorably linked twin practices of music theory and literate composition.[17] Richard Taruskin, too, notes the historical import of new literate musical practices in the fifteenth century, arguing that "the earliest manifestation of

17. Laurenz Lutteken, "The work concept", in *The Cambridge History of Fifteenth-Century Music*, ed. Anna Maria Busse Berger and Jesse Rodin (Cambridge: Cambridge University Press, January 2020), 57, ISBN: 978-1-108-79188-5.

the condition of 'absolute' art or art-for-art's-sake" coincides with the rise of more sophisticated polyphonic practices and the more widespread distribution of the same—developments which would hardly have been possible without the technological refinements of new notation: a robust means of inscribing music's rhythm/meter; collections of non-texted songs, applicable to both vocal and instrumental performance, etc.[18]

Of these new literate musics which emerge during the Renaissance, the (still predominantly liturgical) practice of *cantare super librum* serves as the most poignant example of a notation-mediated open music. Specifically, it requires both a familiarity with the symbols used to encode the melodic framework of a piece of music as well as the creative strategy by which a player might "see through" the notation to the field of improvisatory potential implicitly permitted by the symbolic system. To wit, *cantare super librum*[19]—a technique first described by Tinctoris in his 1477 treatise *Liber de arte contrapuncti*—describes a process by which a group of singers, song-books in hand, spontaneously generate a polyphonic composition in two, three, or more parts using a melodically/rhythmically fixed cantus firmus as a ground which persists across performances. This practice serves as the *ne plus ultra* literate collective-improvisatory music of the fifteenth century.

In contrast with other (earlier and contemporary) literate musics, *Cantare super librum* clearly required a more robust sense of a desired aesthetic for the final work insofar as each participant was required to heed principles of good taste in their use of rhythmic motifs, melodic structure, cadences, etc., in effect each creating an independent contrapuntal voice

18. Taruskin, *Music from the Earliest Notations to the 16th Century*, 541.

19. Translated "singing over the book"—i.e. *contrapunto concertado*, *contrapunto alla mente*, *chant sur le livre* depending on country of origin.

in real time.[20] As such, the practice also necessitated a greater ability to "see through" the open skeletal framework provided by notation into (what we'll dub) the "field of musical potential" — i.e. the network of musical moves available to a performer which fulfill the demands of the work-concept as it is understood.

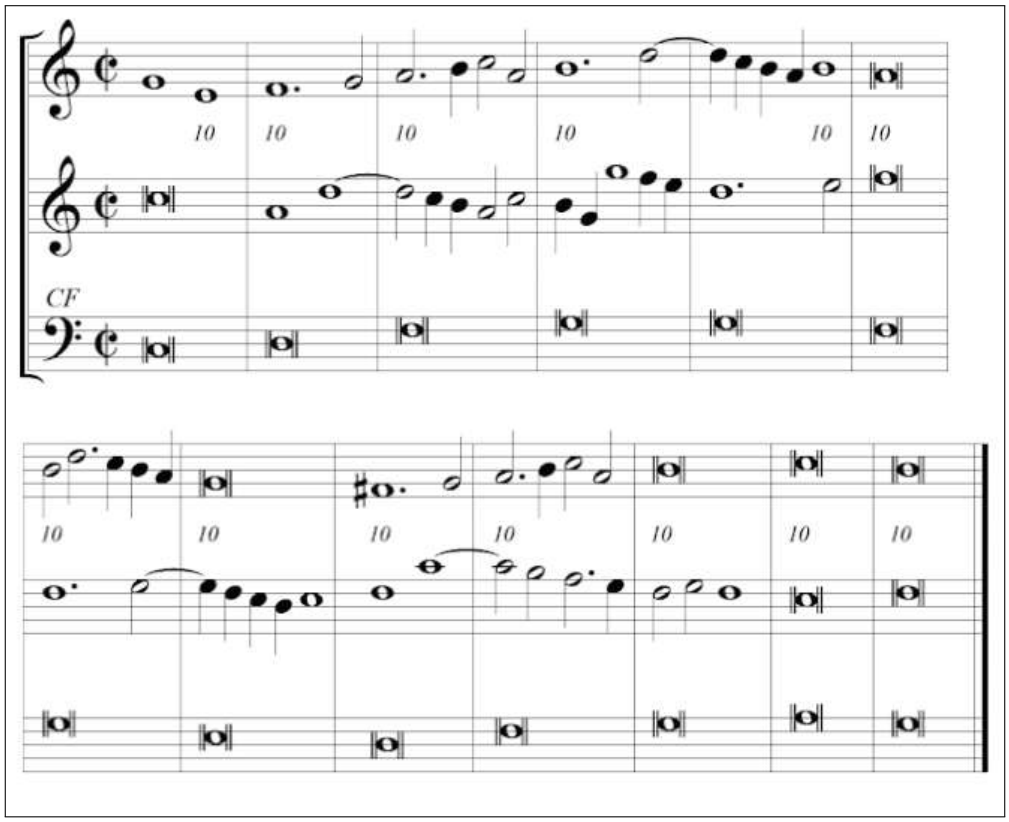


Figure 1.3: A hypothetical contrapuntal "illumination" of a cantus firmus realized in a *cantare super librum* style, per instructions elucidated in later sixteenth-century Italian pedagogical manuscripts.[21]

20. To anticipate a potential objection: The practice of *fauxbourdon* whereby, broadly, singers added parallel consonances in rhythmic isochrony to a cantus firmus similarly required both musical literacy and some degree of extemporization. These techniques were practiced concurrently with *cantare super librum*, but also preceded its use in the church by centuries. As such, *fauxbourdon* might fairly be considered a hinge-point in Western notation worthy of inclusion in this survey. However, while the precise intervallic relationship between cantus, tenor, and other voices differed geographically and by era, within a given *fauxbourdon* tradition, these relationships were more or less static, only rarely departing from their stolid, homophonic note-against-note texture. (Taruskin, *Music from the Earliest Notations to the 16th Century*, 434–7) Thus, while there was no doubt some degree of extemporization (embellishments, cadences, etc.), *fauxbourdon* rather strictly delimited the creative latitude afforded to any one practitioner. "Improvisation" such as it is in this context is token at best in contrast with later, more sophisticated forms of authentically polyphonic performance. As such, I consider *fauxbourdon* less a fully-fledged open form and more a stylistic steppingstone toward the sorts of open music practices which concern this research.

Figure 1.3 above is, of course, only a hypothetical example, helpfully constructed using contemporary sources by early music scholar Elam Rotem. Though presumably the occasional masterpiece extemporization was transcribed for posterity, as with all improvisatory practices the vast, vast majority of *cantare* realizations have been lost to time. While methods varied greatly across Europe during the fifteenth century, certain techniques like the embellished "parallel tenths" model shown in the figure turn up frequently enough to be identified as a core improvisational strategy.[22] Pedagogical treatises, like those of Johannes Tinctoris and his descendants, can give the modern reader a sense of what it must have been like to engage with a cantus firmus *qua* open notation. Universally, these manuals present the reader with potential contrapuntal embellishments—solutions to various intervallic scenarios which over time become familiar enough to the student that recognized patterns in liturgical melodies begin to afford these embellishments directly in performance. Figure 1.4 illustrates three such bite-sized affordances. In the first of these, a stepwise descent in the bass from D to C presents the possibility of a symmetrical stepwise ascent of a 7th in a particular rhythmic pattern. The second shows the inversion of the first, and the third demonstrates a more complex solution over a longer cantus segment. To the fifteenth-century improvising cantor, the aforementioned "field of musical potential" which avails itself *via* the unadorned cantus firmus comprises a sort of networked map, itself comprising countless such embellishments, harmonizations or diminutions—first learned by rote then "forgotten."[23]

21. Elam Rotem et al., "Cantare Super Librum", September 2022, accessed June 30, 2023, `https://www.earlymusicsources.com/youtube/cantaresuperlibrum`.

22. Ibid.

23. (to borrow a turn of phrase perhaps apocryphally ascribed to Charlie Parker)

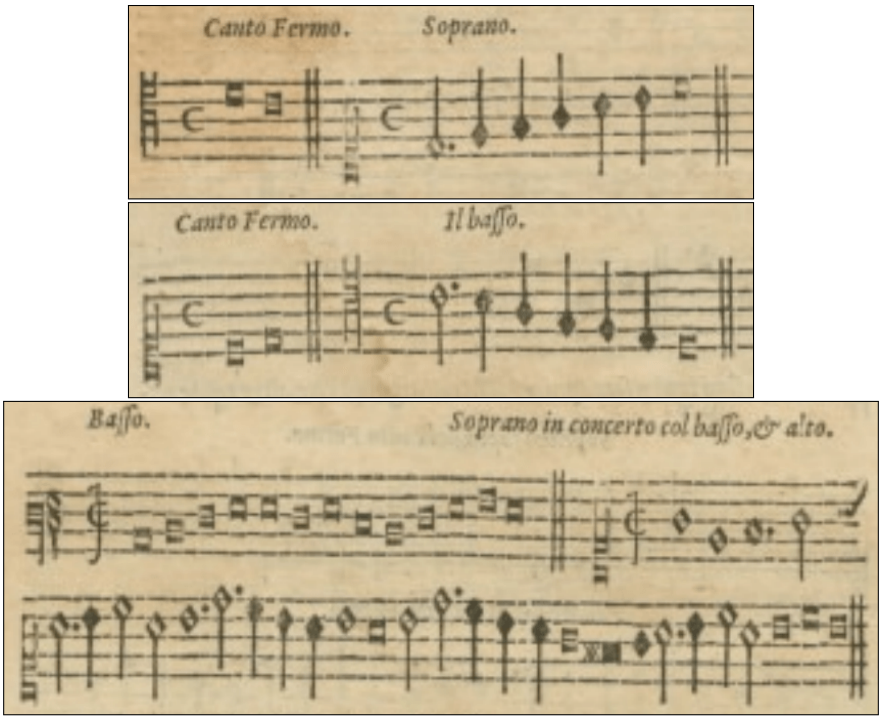


Figure 1.4: Pedagogical "sample" realizations of short cantus firmi, from Vicente Lusitano's 1553 treatise *Introduttione facilissima*.[24]

It is my contention that the fundamental ("phenomenological," if you like) experience of the *cantare super librum* improviser is, despite the vast historical gulf separating them, predominantly similar to the experience of later notation-mediated improvising musicians, be they continuo harpsichordists or bebop trumpet-players. In each case, a musician has the ability to "acquire" a skeletal compositional form via notation (one which, if rendered "directly"—i.e. played note-for-note—would represent a hopelessly impoverished example of the work itself) which they are then expected to illuminate via a series of embellishments or wholesale inventions mediated by strictures communicated by the form itself. These written forms, of course, vary in the degree of detail they express; that is, in the closeness with which their symbolic systems correspond to the finished product (their *fixity*). The performer here constantly negotiates between the printed material, their personal "field of musical potential" acquired via training and experience, their commitments to the performance scenario (e.g. "Is

24. Vicente Lusitano, *Introduttione facilissima, et novissima, di canto fermo, figurato, contraponto semplice, et in concerto*, 3rd (Venice: Francesco Rampazetto, 1561), 15.

this realization appropriate to this time/place/work?"), and, arguably, their sense of artistic identity (e.g. "Does this realization adequately represent *me* as an artist?").

Of course, each musician operating in these disparate genres bears a different, personal relationship to notation itself—indeed, there have been exemplary figures in every era who reach astounding levels of improvisational sensitivity despite being musically "illiterate." Musician-to-musician and teacher-to-student o/aural transmission have, in all cases, formed a crucial component in the building of these "fields" of potential musical moves. To again cite Laurenz Lütteken, "[m]usic does not need to be fixed or transmitted in written form to constitute a work" and neither must musicians necessarily engage with score-artifacts in order to take part in their associated literate traditions.[25] However, contrary to all-too-prevalent attitudes that notation somehow ontologically lags behind music making proper, parasitically dependent on o/aurality for its very existence, I share Floris Schuiling's view that notations themselves "serve to construct forms of musical interaction [...] offer[ing] different ways of imagining sound as music, make different demands on musical knowledge, and condition musicians' creative agency."[26] As such, the notion that (western) music notation is inevitably downstream from somehow "purer" acts of music making is, in my view, untenable. When a notational practice (predominantly open or otherwise) is so inextricably integrated with the learning, dissemination, and reification of musical works, there is a very real sense in which even the musically "illiterate" still engage, by proxy, with structures of notation.

Even insofar as a musician might "graduate" from the printed page— becoming so familiar with an oft-repeated work that s/he no longer needs to physically peer at its skeletal frame—s/he still renders the work in real time using sound-concepts that are best and most often expressed in the system of notation surrounding the work's associated corpus. To reiterate: I take it that this relationship between musician and notation (i.e. between artist/artisan and material) constitutes a style of notational mediation which permanently refigured the

25. Lutteken, "The work concept."

26. Floris Schuiling, "Notation Cultures: Towards an Ethnomusicology of Notation," *Journal of the Royal Musical Association* 144, no. 2 (July 2019): 431, ISSN: 0269-0403, https://doi.org/10.1080/02690403.2019.1651508.

nature of (western art) music-making and which, in essence, still constitutes a large part of the experience of modern musicians today.

In sum, the fifteenth century represents a crucial locus for the development of modern notational practices. First, it sees the rise of a mature mensural notation; one which records both absolute pitch and proportional durational values using a far more robust encoding scheme than in previous generations. Second, the way notation is used in the fifteenth century begins to resemble contemporary usage to a much greater extent in that it gains performative rather than strictly archival/pedagogical utility. The preponderance of theoretical treatises written during this period as well as the new flourishing of complex (written) works which approach composition from a "notation-first" perspective demonstrate that key aspects of the notion of literacy so central to Western art music today were in full swing over half a millennium ago.[27]

There is a very real sense in which fifteenth-century Western notation (particularly notation employed in expressly improvisatory genres like *cantare super librum*) utterly relies on its openness. The notion that a piece of music could somehow be "fully represented" by its score or parts is fundamentally incompatible with the way written music was performed during this era—whether primarily improvised or merely ornamented. Much like the more recent examples of open/literate music-making to be described in later sections, the fifteenth-century musical work-concept only forms at the nexus of composer, performer, and score-artifact—a relationship mediated in no small part by the nature of the symbols themselves.

1.4 Post-fifteenth-century reforms in open notation

Above, I argued that the experiential kernel at the heart of open/literate music performance began, in essence, with improvisatory fifteenth-century polyphony. Of course, this is not to say

27. See, for instance, Ockeghem's experimental *Missa Prolationum* which arguably centers the *manipulation of a symbolic system* as its main compositional process over and above merely crafting a beautiful, genre-appropriate sound-world.

that the intervening centuries between the fifteenth- and twenty-first did not see their share of important development in the art of open notation. Making its first documented appearance in the literature via a Roman manuscript in 1600, the practice of figured *basso continuo*—likely far more familiar to modern readers than *cantare super librum*—would become arguably the most prevalent and durable open notation in Western art music, representing one of the richest examples of a highly o/aural yet strongly notation-mediated performance practice in the literature.[28] Though, to be clear, this chapter lacks the space for any truly detailed treatment of the topic, it should suffice for future comparisons to briefly gloss its novel open notation scheme.

In essence, *basso continuo* refers to both (a) an inscribed bass line and concomitant harmonic structure which, together, undergird a (typically Baroque) performance and (b) the performance practice itself. While frequently used to notate accompanimental sub-ensembles, it crops up often in pieces for unaccompanied homophonic instruments (organ, lute, harpsichord, etc.). Given that *basso continuo* flourished for over 150 years, the technique appeared with many variations according to local convention, though all share a composer-provided bassline (meant to be performed as-written with little variation) and some means of encoding operant harmonies over which the performer improvises according to certain constraints. Though in modern parlance the term is frequently interchanged with "figured-bass," instrumental improvisation over basslines of the *continuo* form long preceded the development of the accompanying numeric figurations. To be precise, Marla Hammel locates the origin of un-figured *continuo avant la lettre* in the aforementioned early polyphonic music of the Catholic church. Figured-bass proper, on the other hand, began in Rome and quickly spread outward owing to its many advantages over the more opaque un-figured variety.[29]

Jeffery Kite-Powell elaborates in his *Performer's Guide to Seventeenth-Century Music*:

> The idea of adding a chordal accompaniment to vocal or instrumental pieces had been

28. Taruskin, *Music from the Earliest Notations to the 16th Century*, 811.

29. Marla Hammel, "The Figured-bass Accompaniment in Bach's Time: A Brief Summary of Its Development and An Examination of Its Use, Together With a Sample Realization, Part I," *Bach* 8, no. 3 (1977): 28–9, ISSN: 0005-3600.

> practiced in one way or another for over a century, either by improvisation or by reading "short score" [...] but the practice grew with special intensity in the declining years of the sixteenth century as musicians began writing—and publishing—such music in the convenient method of figured (and unfigured) basses. As the practice spread, it was applied to older-style polyphonic textures, as well as to the newer ones of solo melody.[30]

This "shorthand" most often takes the form of numeric figuration beneath the given bassline (of the form $\frac{5}{3}$, $\frac{4}{2}$, $\sharp 6$, etc.) which, at a minimum, indicates to a performer which intervals are to be sounded above the bassline—usually without reference to a particular octave. More than mere stand-ins for un-notated tones, though, these numeric glyphs imply particular harmonic fields which in turn form the basis of the performer's improvisatory embellishments on the fundamental line. Figure 1.5 gives a paradigmatic example of figured bass notation as used in Georg Philipp Telemann's violin sonata, TWV 41:F3 (1734) illustrating the soloist's melody with figured bass beneath.

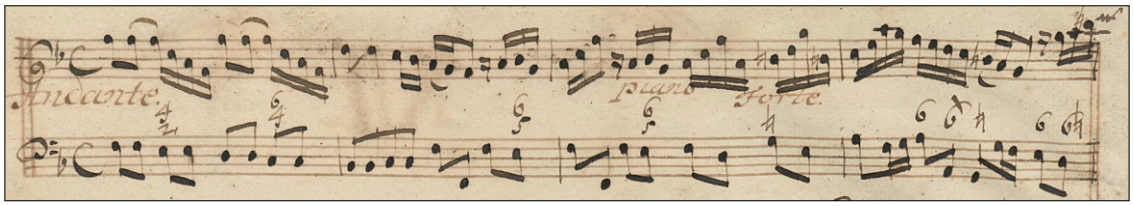


Figure 1.5: A paradigmatic sample of figured bass notation from Telemann's violin sonata TWV 41:F3. Drawn from a contemporary manuscript.[31]

To appropriately realize a figured-bass passage is to delicately balance *recitation*, i.e., recreating the specified bassline and intervals above, and *creation*, i.e., "seeing through" the simple figures to the implied harmonic function and reinforcing it through improvisation. Of course, this raises new questions: If earlier, un-figured lines were sufficient to improvise "over the book" or to provide accompaniment to a soloist, then why was it necessary to conceive and deploy an entirely new set of glyphs—i.e. yet another system to teach and to memorize?

30. Jeffery Kite-Powell, *A Performer's Guide to Seventeenth-Century Music, Second Edition* (Indiana University Press, March 2012), 317.

31. "Violin Sonata, TWV 41:F3 (Telemann, Georg Philipp)," accessed July 1, 2023, https://imslp.org/wiki/Special:ReverseLookup/325279.

And what significance do these new symbols have to the relationship between performer and score if performers were getting on well enough without them?

In essence, figured *continuo* was a labor-saving device; a novel musico-graphic technology. The skills required to quickly examine a number of vocal or instrumental parts (or even a lone bassline) and extract enough salient harmonic information to cogently improvise behind an ensemble required extensive training: time and money. These figurations allowed a composer to much more efficiently and precisely communicate a piece's harmonic structure to a would-be improviser while also allowing less-musically-literate performers the opportunity to meaningfully participate in otherwise inaccessible music. Though the degree of figuration provided would differ according to time, place, composer, and publisher, to the extent that they were present these figures lent performers more clarity and composers greater control of the otherwise thorny, opaque process of improvisational accompaniment.[32]

Ultimately, I contend that *basso continuo* still fundamentally upholds the *cantare* model of composition/improvisation insofar as it is still ultimately left up to the performers' training and good taste to determine the authentic/appropriate bounds for their contributions. However, the introduction of a new, bespoke system for encoding harmonic information does represent an important turning point in Western notation. Specifically, it marks an early concerted effort to sculpt and/or facilitate the communication of the boundaries of improvisatory musicmaking. Musical glyphs had, since the fifteenth century at latest, been forced to pull double-duty in somehow representing not only the fixed parameters of performance but the open ones as well. Though figurations would never fully obviate performer expertise in sussing out these open parameters, they provided a simple graphic synopsis through which to conceptualize a work's changing harmonic field (and indeed even even harmony generally).

As any student of music history is aware, though, this long, rich period of well-integrated literate/improvisatory practice was not to last forever. Certainly, the bulk of Western art music practiced today demonstrates a far scantier degree of interpretive latitude when it

32. Kite-Powell, *A Performer's Guide to Seventeenth-Century Music, Second Edition*, 321.

comes to score-reading. Robin Moore, in an essay titled "The Decline of Improvisation in Western Art Music," sums up: Today, he claims, "[t]he mandates of compositionally specified interpretation now supersede those of the instrumentalist. To many, improvisatory expression seems threatening, unfamiliar, or undeserving of interest."[33]

Of course, despite the fact that the musical period marked by widespread *continuo* practice is commonly thought of as the local apex of "classical" improvisation, this is not to suggest that improvisation in Western art music surreptitiously vanished at the end of the Baroque period. Eighteenth-century giants W. A. Mozart and Ludwig Beethoven are generally noted to have been skilled improvisers whose extemporizations often made their way into their finished works. Indeed, as Moore continues,

> Even well into the 19th century it is clear that improvisation remained an indispensable ability for most professional musicians. We know that Brahms, Paganini, Chopin, Clara and Robert Schumann, Mendelssohn, Hummel, Cramer, Ries, Spohr, Joachim, and Schubert, to cite a few familiar names, were all accomplished improvisers in addition to composers and/or performers of precomposed music.

Further, systematized improvisatory styles waxed and waned in intervening centuries. French liturgical organ music, for instance, saw increasingly codified improvisation throughout the eighteenth and nineteenth centuries, expounded upon by contemporary scholar-pedagogues like Alexandre-Étienne Choron[34], François-Joseph Fétis[35], and their heirs Louis Niedermeyer and Joseph d'Ortigue[36], François-Auguste Gevaert[37], and Jacques-Nicolas Lemmens.[38]

These improvisatory practices, however, differ from those of the Baroque and Renaissance in one critical sense. Rather than make use of yet more sophisticated notations-for-improvisers, they instead (in a sense) retrogress. As the eighteenth century wears on, music begins to

33. Robin Moore, "The Decline of Improvisation in Western Art Music: An Interpretation of Change," *International Review of the Aesthetics and Sociology of Music* 23, no. 1 (1992): 63, ISSN: 0351-5796, https://doi.org/10.2307/836956.

34. *Sommaire de l'Histoire de la Musique* (1810)

35. *Méthode élémentaire de plain-chant à l'usage des séminaires, des chantres et organistes* (1843)

36. *Gregorian Accompaniment: A Theoretical and Practical Treatise Upon the Accompaniment of Plainsong* (1856–7) (helpfully available in English, translated by Wallace Goodrich)

37. *Méthode pour l'Enseignement du Plain-chant et la Manière de l'Accompagner, Suivie de Nombreux Exemples* (1856)

38. *Du Chant Gregorien, sa Melodie, son Rythme, son Harmonisation* (1886 posth.)

become more and more fixed-in-place on the score: where improvisation occurs, it occurs *contra* the score rather than through it. The next section of this chapter will briefly attempt to account for this historical waning of open-notation-centric performance models and the turn toward yet greater degrees of notational fixity in the late-eighteenth and nineteenth centuries.

1.5 Concretizing the sound-concept

In a sense, a synopsis of the Romantic period could begin and end with George Lewis' terse assessment of the situation:

> By the end of the nineteenth century, the practice of improvisation as a form of professionalized artmaking had all but disappeared from Western classical music. This gradual elimination of improvisation did not take place without resistance, most prominently including French organ performance. However, this break with what had heretofore been "the" Western tradition certainly constituted a radical rupture with over a half-millenium [sic] of canonical practice [...][39]

Lewis' short paper (focusing primarily on recent developments in improvisation pedagogy) does not attempt to account for this decline, though a number of other authors have. Charles Rosen, in a paper on the role of ornamental gesture in Beethoven's corpus, describes the late-eighteenth-century decline of "open" ornamentation (e.g. appoggiaturas, trills, mordents, grace notes, passing tones, etc.; either deliberately written into the score at key points or generally understood to be permitted/desired) as "one of history's most sweeping revolutions in taste." For Rosen, this was but one symptom of a culture-wide trend toward elegant simplicity and away from obscurant decoration: one which held sway in architecture and the fine arts just as much as it did in music. Whether the addition of improvised ornaments to Mozart's music constitutes an "authentic" eighteenth century practice remains a hotly contested issue. However, it seems to be a foregone conclusion that during the era of

39. George E. Lewis, "Improvisation and Pedagogy: Background and Focus of Inquiry", *Critical Studies in Improvisation / Études critiques en improvisation* 3, no. 22 (December 2007), ISSN: 1712-0624, https://doi.org/10.21083/csieci.v3i2.412, https://www.criticalimprov.com/index.php/csieci/article/view/412.

Beethoven's flourishing these additions were considered very much passé—even to the point that Carl Czerny drew the composer's ire when he, by second-nature, added trills and octave doublings to Beethoven's work.[40] This is to say nothing of the venerable practice of basso continuo which, per Taruskin, fell out of general favor during the mid eighteenth-century[41] and suffered a fatal blow via its omission from Christoph Gluck's opera *Orfeo ed Euridice* (1762)—"the first opera that [could] be performed without the use of any continuo-realizing instruments".[42]

In broad strokes, these changes in the function of notation whether visible (in the case of the disappearing continuo) or invisible (the proscription of the traditional "un-notated" embellishments) pointed to a radically transfigured art music landscape—one in the process of transferring creative agency away from performers and toward composers who, increasingly, bore the responsibility of fixing *one* particular sonic realization of a work into notation: a realization wholly imagined by the composer him/herself. The sonic traces of the old embellishments persisted, of course. While penning his violin sonatas Beethoven imagined and recorded the same trills, turns, and keyboard harmonies to which he had grown accustomed over the course of his musical upbringing—no doubt improvised in many cases by diligent performers. The critical difference is that by the late eighteenth/early nineteenth century, Beethoven and his contemporaries began *concretizing* these same gestures; in effect rendering their received notational tools more semantically fixed than ever before. Thus while the casual listener, unfamiliar with this radical new *fixing* of notation semantics, would not necessarily notice a change insofar as the sound/gesture is concerned, the nineteenth-century performer accustomed to a distinctly open mode of play now bears an entirely new relationship to the score-artifact: one characterized far more by mechanical reproduction that by artisanal

40. Charles Rosen, "Ornament and Structure in Beethoven," *The Musical Times* 111, no. 1534 (1970): 1198–9, ISSN: 0027-4666, https://doi.org/10.2307/955820.

41. Richard Taruskin, *Music in the Nineteenth Century: The Oxford History of Western Music*, Illustrated edition (Oxford; New York: Oxford University Press, July 2009), 428, ISBN: 978-0-19-538483-3.

42. Richard Taruskin, *Music in the Seventeenth and Eighteenth Centuries: The Oxford History of Western Music*, Revised ed. edition (Oxford; New York: Oxford University Press, July 2009), 457, ISBN: 978-0-19-538482-6.

creation. Figure 1.6 gives a token example taken from the famous *Kreuzer Sonata* illustrating a typical deployment of Beethoven's embellishments. A century prior, a violinist approaching this passage would have had a plethora of interpretive possibilities open to him given the extent to which his practice was necessarily embedded in open notation. Beethoven's violinist, on the other hand, is condemned to read ***tr*** in a very particular way; conditioned by decades of pedagogical texts which were more strict in their gestural prescriptions. In other words, the eighteenth-century ***tr*** grants far less creative latitude than the seventeenth-century equivalent despite comprising the very same symbol.

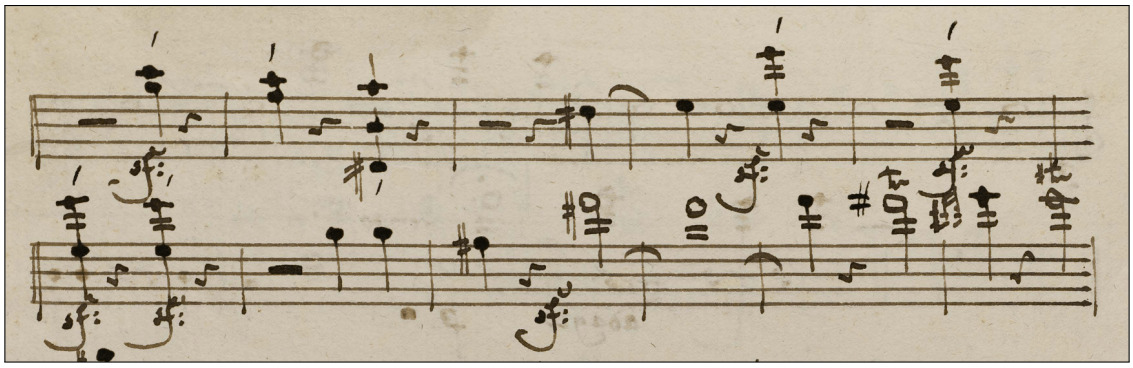


Figure 1.6: Mm. 66–76 from Beethoven's *Kreuzer Sonata*. Violin part excerpted from original manuscript.[43]

To sum up, two major changes in the printed page have taken place: first, the glyphs which explicitly grant improvisatory latitude to the performer—namely, figured bass indications and the host of baroque ornamentation symbols—have been stripped away, replaced by precise voicings and occasional ***tr*** markings. Second, beyond the addition of fully-realized harmonies which replace the now-missing figured bass, composers began delineating their idealized performance further still via the use of more frequent and more specific dynamic indications, tempo markings, articulations and expressive text. This is of course not to claim that broader improvisational practices disappeared all together during this period—Beethoven, like the vast majority of his professional peers, was known to have been a talented improviser.[44]

43. "Violin Sonata No.9, Op.47 (Beethoven, Ludwig van)," accessed July 1, 2023, `https://imslp.org/wiki/Special:ReverseLookup/107287`.

44. Taruskin, *Music in the 17th and 18th Centuries*, 652–3.

Further, his explicit instruction in the "Emperor" concerto to "not make a cadenza here, but play immediately the following [...]" illustrates that performers were still commonly expected to freely improvise at cadences at least as late as 1809—though it gradually became more commonplace over the nineteenth century to merely execute fully-notated composer-provided cadenzas.[45] Thus, perhaps predictably, it seems that the first casualty of the large-scale trend toward the fixity of the sound-concept (which will eventually result in the disappearance of nearly *all* Western art music improvisation by the turn of the twentieth century) is the notation which traditionally represented its *openness*.

Accounts of this decline in performer agency seem, broadly, to take two different tacks; centering either changes in *aesthetic values* over the long eighteenth century or changes in *socioeconomic factors*. Where Charles Rosen cites a "solid body of aesthetic doctrine which condemned ornament [considered whole] as immoral,"[46] Robin Moore's more detailed essay considers aesthetics to be functionally downstream of "the effect of technological development and industrialization," as well as "the effect[s] of notation and literacy."[47] Felix Diergarten further expounds on these pedagogical causes by describing an invisible war which took place in nineteenth-century music academies between proponents of the agèd Italian partimento tradition and those of the new German models of music theory.[48] Partimento pedagogy held that the most effective means of internalizing realities of musical composition and performance was its practice. Students were exposed early on to countless musical prototypes and exemplars, perhaps the most famous of which was the *regola dell'ottava*—the rule of the octave—which served as a schema by which a student could harmonize arbitrarily complex basslines *ex tempore*. Only via this vocabulary-focused hands-on approach did students gain insight into what motivated particular "musical moves" compositionally and, in tandem, learn to build this vocabulary into their personal, improvisatory, network of musical moves.

45. Joseph P. Swain, "Form and Function of the Classical Cadenza," *The Journal of Musicology* 6, no. 1 (1988): 45, ISSN: 0277-9269, https://doi.org/10.2307/763668.

46. Rosen, "Ornament and Structure in Beethoven," 1198.

47. Moore, "The Decline of Improvisation," 80.

48. Felix Diergarten, "Romantic thoroughbass: music theory between improvisation, composition and performance", *Theoria: historical aspects of music theory* 18 (2011): 5–36, ISSN: 1554-1312.

The German approach, on the other hand, eschewed these "recipes and household remedies" in favor of logically organized principles: universally applicable rules able to explain in hierarchical terms what motivated movement from tonic to dominant or why some tones seemed to supervene on others.[49] Though these two approaches persisted contemporaneously for some time, it was ultimately the latter system which won out—as might be demonstrated by peering at any undergraduate theory syllabus written in the past hundred years or so.

Robin Moore buttresses this socioeconomic/pedagogical argument and specifically tethers the decline of improvisatory practice to (among many other factors) issues of notation. Per his 1992 paper "The Decline of Improvisation in Western Art Music",[50]

> The increasing importance of notation as a pedagogical tool and performance aid in the nineteenth century can similarly be explained in terms of the gradual replacement of the patronage musician at that time with the middle class performer. Scores and written arrangements for the piano were imperative to the dissemination of elite music among a broader audience in two senses. First they allowed for individual family members to learn music themselves, and to avoid the prohibitive costs of hiring professional musicians. [...] Secondly, *notated music provided the detailed performative instructions necessary for those interested in learning to play a style of music with which they were unfamiliar. Sheet music became a means of learning aristocratic music for those who had no exposure to it in its original context.*[51]

Here, I think, lies the simple math at the crux of the issue: once a more rarefied ecclesiastical (and/or) scholarly (and/or) aristocratic pursuit, art music had the luxury of a much smaller pedagogue-to-pupil ratio. As such, the tools of its creation and dissemination could be put to much subtler use. Students who had the privilege of close master/apprentice-style tutelage were able to develop literate improvisation schemas which corresponded closely to marks printed on the page. With the explosion of middle class performers (and performance opportunities), musicians had neither the time nor the money to dedicate years to the development of these schemas. Figure 1.7 illustrates one of the first examples of music published for this growing market "in »complete« form, with all necessary ornamentation written out in an appropriate manner for those who might otherwise be unable to interpret the

49. Diergarten, "Romantic thoroughbass," 9.
50. Emphasis in quotes will be mine unless otherwise noted.
51. Moore, "The Decline of Improvisation," 72.

score improvisationally."[52] Put simply, new, more "fixed" notation conventions (the standard trill in m. 11 and the turn and trill-to-mordant in m. 12) have replaced prior open notations and thereby obviated any knowledge of the delicate art of embellishment.

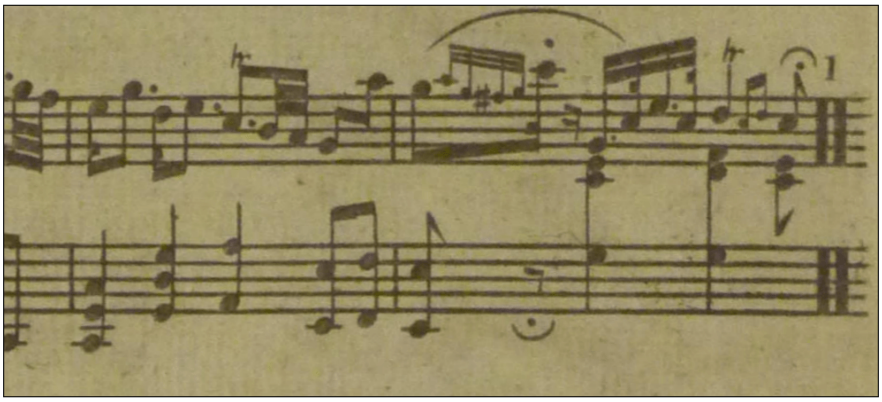


Figure 1.7: Mm. 11–12 from the first Andante of Domenico Corri's *Loch Erroch Side* Variations demonstrating a carefully-realized cadence—far more "fixed" than earlier published keyboard works.[53]

What was once merely the skeletal framework for a "finished" composition necessarily became representative of the entire sonic trace of the work—a condition which was, I take it, inextricable from a concomitant change in taste which demanded that the composer be responsible for the "entirety" of the work. Consequently, conservatories and other formal pedagogical centers either willingly or reluctantly began orienting their lessons toward this new fixed model of composition: to oversimplify, it seems that the explanatory power of German theoretical models benefited by having fixed pieces for analysis—complete at time of writing—rather than the more nebulous pre-nineteenth-century works which necessarily varied from performance to performance, relying on performers' input to ever be truly "finished."

By the turn of the twentieth century, this new paradigm of notational fixity was thoroughly entrenched. While pockets of resistance clung tenaciously to life (e.g. in the aforementioned French liturgical tradition), Western art music notation by and large only developed insofar

52. Moore, "The Decline of Improvisation," 72.

53. "Variations on 'Loch Erroch Side', IDC 4 (Corri, Domenico)," accessed July 1, 2023, https://imslp.org/wiki/Special:ReverseLookup/514849.

as it fixed the sound-concept of the musical work in finer and finer detail.[54] To this day, there is a very real sense in which art music in the European tradition is still produced and consumed under the hegemony of this nineteenth-century notation paradigm. To the extent that alternatives exist, they are practiced in the broad historical shadow of western notation—either derived from it (as is the case with the notation commonly used to record and study the Iranian *radif* tradition—if not to teach it) or carved away as a "subaltern" which will necessarily be contrasted with it (as is the case with, for example, the various types of Japanese shakuhachi notation). Thanks in no small part to centuries of brutal colonial dominance by a "global north" whose modes of musical production often eclipse even long-lived local practices, western notation serves as a *lingua franca* across (not all, but) a broad range of the world's musical styles and practices—both those which might fit under the umbrella of "art music" generally, as well as more quotidian vernacular practices.

In the next section, I'll discuss in brief the rise of perhaps the most successful challenge to this "fixed paradigm"—the ascension of notation-mediated jazz improvisation—which coincided with jazz's own ascent from a rather localized vernacular music to a radically transfigured art music all its own. Given that this chapter has thus far served as a gloss of Western art music notation practices, this detour into a discussion of jazz notation might seem tangential. Our ultimate aim here, though, is a cogent analysis of a variety of specific open notation practices in the late twentieth century—many of which sit at the interstices between Western art music and jazz proper. Further, while most would not consider jazz (even in its mature form) to be an offshoot of Western art music *per se*, the two have been, since the latter genre's nascence, hopelessly entwined—sharing mutual creative influence, personnel, theory, technique, and of course notation.

54. Consider, for instance, the growing compass of dynamic indications. Where, for Mozart (1756–91), a range of ***pp*** to ***ff*** was plenty (and these extremes only appear rarely), Tchaikovsky's (1840–93) oeuvre ranged from ***pppppp*** to ***ffff*** in his *Pathétique* and Fifth Symphonies, respectively. Not to be outdone, György Ligeti's (1923–2006) range encompasses ***ppppppppp*** (Piano Étude No. 9) to ***fffffffffff*** (*Le Grand Macabre*).

1.6 The Afro-diasporic return to open notation

To be crystal-clear up front: Jazz does not bear the same relationship to musical literacy as does western concert music. "Literacy" in the sense we have discussed it thus far is simply not a prerequisite for meaningful musical interaction in jazz performance. Paul Berliner's *Thinking in Jazz* (1994), one of the most thorough jazz ethnographies published so far, cites several examples of renowned artists who attained fluency with western notation only quite late in their careers—and indeed stresses that in some cases an over-reliance on printed materials can meaningfully hinder jazz students' development.[55] We might attribute this to the fact that jazz developed under radically different conditions than did western "classical" music. Autodidacticism and musician-to-musician o/aurality (to contrast with the centralized authority of the academy/conservatory and teacher-to-pupil o/aurality) traditionally played a much greater role in jazz than in the European tradition. In instances where students lacked the central knowledge base a formal institution which might favor transmission-by-notation, burgeoning jazz musicians might turn to direct transcription from recordings or other performances to acquire their improvisation schema and library of works. Further, many jazz instructors (despite a full working knowledge of western notation) deliberately de-emphasize(d) reading in their pedagogical practice—instead emphasizing the roles of listening and memory in acquiring and deploying genre-appropriate vocabulary.[56] Debates over the relative worth of orality and literacy in jazz have been hashed out far better than I could hope to achieve here by the likes of Ingrid Monson, Gunther Schuller, and Berliner himself—thus I will stop short of throwing in my two cents on the topic. However, even if we admit to the notion that (as many would perhaps rightly claim) jazz is first and foremost an o/aural tradition, this fact does not preclude our consideration of the pivotal role that notation plays in its (again) pedagogy, acquisition and performance.

It is important to note that jazz was "open" before it was ever notated. To the extent

55. Paul F. Berliner, *Thinking in Jazz: The Infinite Art of Improvisation*, 1st edition (Chicago: University of Chicago Press, October 1994), 111, ISBN: 978-0-226-04381-4.
56. Ibid., 112–3.

that jazz performers have adopted techniques of western notation, they have always done so to further the agenda of open, largely improvised performance. That is to say: the primary mode of play in jazz performance centers on highly variegated renditions of existing tunes drawn from any number of creative wellsprings: original compositions, popular songs, folk tunes, etc. How far these renditions depart from some central, organizing artifact (be it one "ancestral" recorded performance, one particular arrangement, etc.) also varies from period to period and from sub-genre to sub-genre. While indeed the "same-but-different" model adopted by jazz performers bears a strong resemblance to aspects of figured-bass-oriented baroque performance practice, jazz renditions are often strikingly distinct (rhythmically, melodically, harmonically) from their original sources when compared to what we know of Renaissance and baroque improvisation. Figures 1.8 and 1.9 illustrate a particularly wide gap between original source and jazz rendition (a gap that forms an important part of Robert Walser's thesis in his fascinating 1993 paper "Out of Notes").

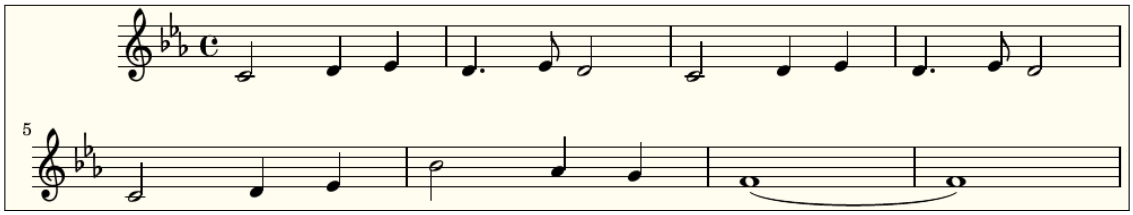


Figure 1.8: First eight measures of the chorus to "My Funny Valentine" as originally printed in the 1937 edition (virtually identical to countless versions printed in fakebooks since).

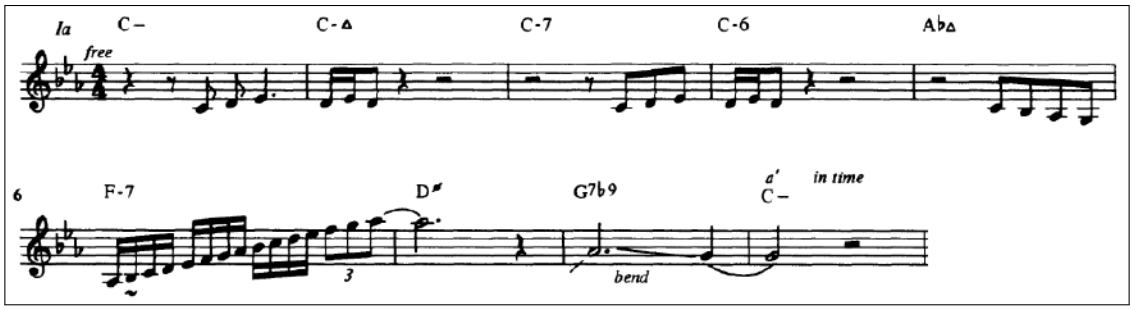


Figure 1.9: First nine measures of Miles Davis' melody statement of "My Funny Valentine," taken from his 1964 recording. As transcribed by Robert Walser.[57]

Here, as in the earlier fifteenth-century examples, notation has the ability to "speak to" a jazz performer in a particular way, affording a range of potential gestures to be realized in performance. The distinction between Figures 1.8 and 1.9, both (insofar as the language of jazz is concerned) unmistakably instances of the same "work-concept," demonstrates how broad a field of potential is inferred by the symbols on the page. Naturally, these symbols as originally penned were not *deliberately* imbued with these affordances by a composer ("top-down"). Rather, precisely *how* the notation speaks to a performer is contingent on a number of factors—in this example, on Davis' formal training in the western notation paradigm, his experiences with jazz instructors, his countless hours transcribing past performances, his personal taste, etc. While at the time of the cited performance, Davis was undoubtedly "off book," having committed the tune's skeletal framework to memory and no longer requiring printed music in order to faithfully perform his rendition, the ⟨skeletal framework → field of potential⟩ model still obtains. That is to say, a performer unfamiliar with the tune might, when presented with its framework in the form of melody and lead-sheet symbols, arrive at a similarly-structured rendition.

It is these lead-sheet symbols (e.g. C^{Δ}, $C^{-7\flat5}$, C°, etc.) which form one of the most salient, concrete points of departure from "traditional" (read: nineteenth-century) notation and

57. Robert Walser, "Out of Notes: Signification, Interpretation, and the Problem of Miles Davis," *The Musical Quarterly* 77, no. 2 (1993): 343–365, ISSN: 0027-4631.

toward a new, now decidedly Afro-diasporic hybrid model of notation-mediated musicmaking. Mark Abel, in a much-needed 2016 paper on these symbols' history and function traces their origin from their aforementioned ancestral beginnings in figured-bass notation and *alfabeto* (a sixteenth-century derivation of lute tablature) to their formal introduction in the 1920s in popular music charts meant for amateur consumption, then finally to their modern-day use in jazz performance contexts. Per Abel, George Goodwin's "TuneDex" cards—bundles of Rolodex-like notecards sold via a mail-in subscription service which featured simplified versions of popular melodies and their attendant chord symbols—were such an overnight success that their sparse notational language became *de rigueur* for jazz and pop musicians across the industry.[58]

These three-part glyphs which indicate an operant chord's root, quality, and extensions (without regard for inversion) were originally employed as labor-saving devices—that is, as a means to obviate any knowledge of tonal harmony on the part of rhythm section players. These were (and still are in pop music compendia) often accompanied by fingering diagrams for ukulele, guitar, or banjo such that the performer need not possess basic musical literacy in the traditional sense—merely an understanding of the fundamental mechanics of their instrument. However, for Abel, because these chord symbols represent a new layer of abstraction in between the harmony underlying a composition and that harmony's reification in sound, they also afford players a "radical openness" in performance, permitting

> new expressive possibilities, and [...] new creative relationships between individuals and collectives capable of eroding the profound schisms between composer and performer, producer and consumer, which have bedevilled the sociology of music in Western modernity.[59]

To wit, once chord symbols became part of the standard operating procedure for the composition, dissemination and performance of jazz, he claims, musicians began further conceiving of their improvisations as part and parcel of a harmonic "grid" wherein changing

58. Mark Abel, "Radical openness: Chord symbols, musical abstraction and modernism", *Radical Philosophy*, no. 195 (2016): 28, ISSN: 0300-211X, https://www.radicalphilosophy.com/article/radical-openness.
59. Ibid.

chordal fields pertinent to the melody proceed as time progresses. Rather than viewing them as limiting factors which impinge upon improvisatory freedom, Abel sees chord symbols as creative mediators which "[open up] the rapid 'vertical' development of musical harmony," facilitating "alterations and substitutions" hitherto inconceivable under earlier, more fixed paradigms of harmonic notation. Further, the liberation of the chord progression from a nineteenth-century conception of hierarchical structure *via* these abstract symbols permitted a departure from the notion of a singular key center in both composition and improvisation; paving the way for pieces like the (in)famous middle-period works of John Coltrane ("Giant Steps," "Countdown," et al.) which flit liberally from temporary tonic to temporary tonic.

In "Radical Openness," Abel stops short of drawing any particular musico-ethnographic conclusions regarding the widespread adoption of the lead-sheet symbol in jazz performance. At the risk of verging into hermeneutics, I would put forward that perhaps we ought to interpret the rise of the lead-sheet—arguably the most important integration of art music and open notation since the decline of figured bass—not solely as a happy accident stemming from the decline of musical literacy in the early twentieth century, but also as an *active assimilation* of old-guard Eurocentric musical knowledge by a growing pool of artists working in a relatively young Afrocentric paradigm. In essence, the lead-sheet served as a new musical technology developed via a fusion of the now "fully-fixed" European art music notation and the mediated openness of Afro-diasporic o/aural practices. That such a fusion could be catalyzed by such a "low-brow," utilitarian notational device as the chord symbol rather than, say, by a concerted effort on the part of some great musical innovator should not go without mention.

Each chord symbol (as employed by the jazz improviser) serves as a sort of map of a particular harmonic territory; one which applies to the melody of a tune (insofar as it, like a figured bass symbol, indicates which sort of harmony ought to be played underneath the recited melodic line) as well as, canonically, to the harmonic structure of the improvisation which follows. As they progress, each glyph "projects" a particular field of potential musical

action into the mind of the performer. As with the other open notation schemes we have observed thus far, players are then able to make informed musical moves via a combination of pre-performance data (musical upbringing, personal taste, spoken instructions) as well as the creative constraints on the page.

As such, I take it that this experience does not fundamentally differ from the phenomenology of the figured-bass interpreter and thus does not represent some profound new modulation of the performer/composer relationship (as perhaps the genres' very different sonic traces would imply). However, lead-sheet interpretation is particularly interesting in that it represents an instance of "parallel evolution" (albeit one displaced by a few hundred years) with the aforementioned figured bass (and/or *alfabeto*, etc.) insofar as it rose to prominence as a musical technology out of a similar necessity: the need to disseminate and perform vast quantities of new music by equally new, less literate sectors of the musical public as well as the need to save material and labor on copying and music publishing. The lead-sheet differs, however, in that, per Abel's claims, it was able to exceed its humble origins and form a key part of the corpus of the new American art music *non plus ultra*, ultimately facilitating a new sort of harmonic conception of musical forms and thereby paving the way for the myriad harmonic languages with which jazz musicians express themselves through to the present day.

Given the rapid adoption and prevalence of this new musical technology by the end of the second world war, one might expect to see its use somehow reflected in the score-making practices of more traditional art-music composers. Ultimately, though, while jazz (in several understandings of the term) would absolutely have an outsize impact on the new "classical" music of the mid-twentieth-century, jazz's lead-sheet model of open composition would never be imported wholesale. However, the 1950s and 1960s *did* bring with them a veritable explosion of innovative and highly individualistic new modes of composition which in turn required attendant new forms of notation. In this chapter's final section, I will examine what I take to be the most historically impactful of these, including, crucially, the extent to which they were (or indeed were not) expressly tied to jazz's ethos, structure, and notational

reforms.

1.7 Postwar: new open musics

As I hope has been demonstrated by this point, the histories of our numerous literate art musics are replete with examples of notation having been modified or invented wholesale to suit some material need in the composition, distribution, learning, and performance of musical works. Indeed, the concert music of the mid-twentieth century was no exception. To the contrary, new forms of open music taken together formed a crucial "reaction formation" (if you'll permit the analogy) against the rising tide of serialist compositional practices which by that time were *de rigueur*; serving as the received language of European-style avant-gardism.[60]

This is of course not to claim that this new interest in musical openness was entirely coextensive with a new fervor for creative notations. Many noteworthy pieces were constructed which eschewed the romantic fixity of sound-concept using little more than traditional notation—albeit occasionally modified to better suit its new purpose. Before it was amended and republished, Luciano Berio's original *Sequenza* (1958) (excerpted in Fig. 1.10) experimented with flexible "proportional" rhythmic notation[61] and Terry Riley's standout *In C* (1964) (Fig. 1.11) permits performances which widely vary in personnel, duration, etc. by employing short modular units of traditional notation to be repeated *ad libitum* by individual performers.

60. Richard Taruskin, *Music in the Late Twentieth Century: The Oxford History of Western Music*, Revised ed. edition (New York: Oxford University Press, July 2009), 14–5, ISBN: 978-0-19-538485-7.

61. Paul Griffiths identifies this as 'space-time notation,' though I've not heard the term elsewhere.

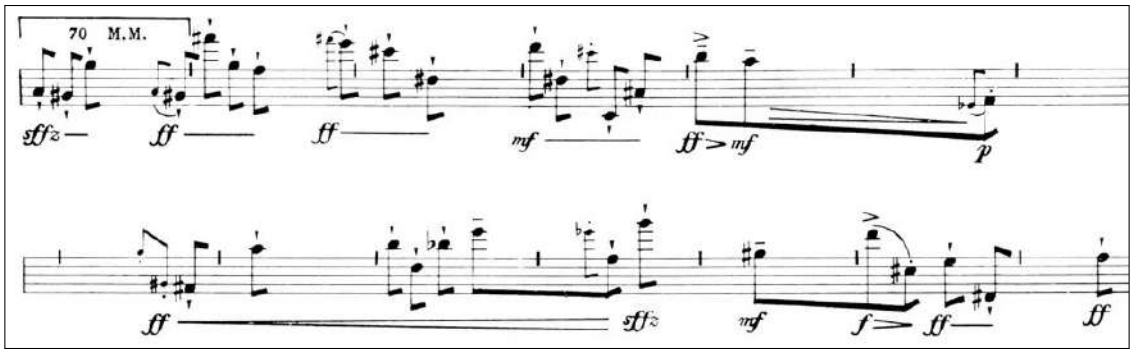


Figure 1.10: First two systems from the original edition of Luciano Berio's *Sequenza* (I) which deploys quasi-open proportional notation.[62]

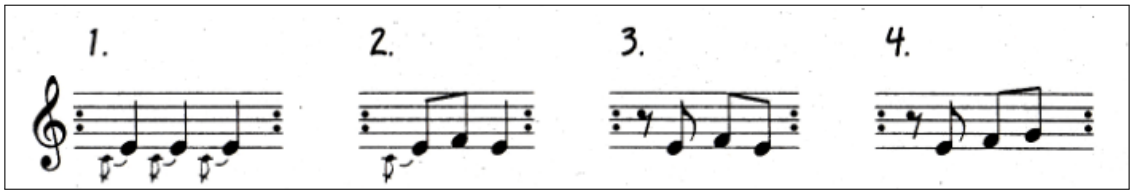


Figure 1.11: First four modules from Terry Riley's *In C* (1964). An open score featuring pared-down traditional notation.[63]

However, insofar as they represent *such* a drastic departure from traditional methods of musical representation, it is often the pieces employing "neo-notation" (i.e. any built-to-purpose notation which distinguishes itself from canonical common-practice methods, be it in service of "open music" or not) which most captivate composers, musicians, and laity alike. Most authoritative sources point to the earliest days of the 1950s as the beginning of this new compositional mode; specifically citing "New York School" composer Morton Feldman as the first to work in this style. Even John Cage, perhaps the best-known composer of open music in this vein, credits Feldman with the style's genesis (though he dubbed it "[music] indeterminate with respect to its performance").[64] The first system of *Projection 1* (1950), the composition credited with launching this new fervor for open works, is shown in

62. Luciano Berio, *Sequenza per Flauto Solo* (Edizioni Suvini Zerboni, 1958).

63. Robert Carl, *Terry Riley's In C - New Music USA*, January 2010, https://newmusicusa.org/nmbx/terry-rileys-in-c/.

64. Ryan Dohoney, "Spontaneity, Intimacy, and Friendship in Morton Feldman's Music of the 1950s", *Modernism/modernity Print Plus*, September 2017, https://modernismmodernity.org/articles/morton-feldman.

Figure 1.12.

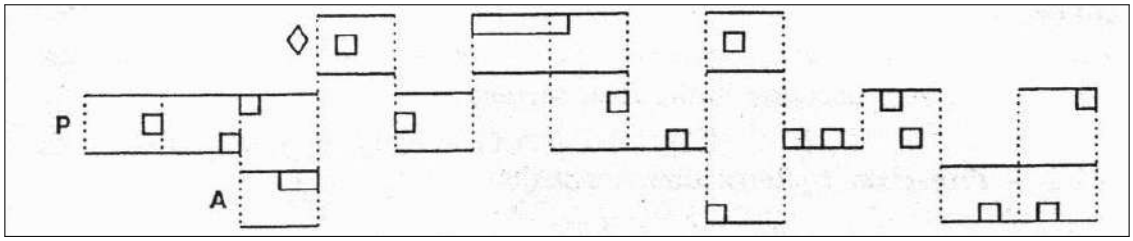


Figure 1.12: First system of Feldman's *Projection 1* for solo 'cello (1950). Often cited as the first noteworthy instance of "graphic" neo-notation.[65]

Though the graphic system he employs seems quite opaque at first blush, Feldman is quite explicit with how his notation is to be interpreted, providing a block of text right at the top of the page:

> Timbre is indicated: ◇ = harmonic; P = pizzicato; A = arco. Relative pitch (high, middle, low) is indicated: $\overline{\blacksquare}$ = high; $\overline{\underline{\blacksquare}}$ = middle; $\underline{\blacksquare}$ = low. Any tone within the ranges indicated may be sounded. The limits of these ranges may be freely chosen by the player. Duration is indicated by the amount of space taken up by the square or rectangle, each box (⋮ ⋮) being potentially 4 icti. The single ictus or pulse is at the tempo 72 or thereabouts.[66]

Here, Feldman cedes absolute control over some traditionally fixed musical parameters (pitch, duration) while maintaining control of others (timbre, instrumentation, order of events). The radical break from tradition posed by the "graphics" used to represent these events belies the fact that the work is only slightly "further open" than many earlier, more conventionally-notated works (e.g. similarly "proportional" seventeenth-century unmeasured preludes of the form shown in Figure 1.1). Only with regard to the pitch axis is Feldman's work truly phenomenologically distinct from these earlier works: a performer must now creatively decide (a) (pre-performance) what range to assign to the upper/lower bounds of each box and (b) (in-the-moment) precisely which pitch in that range to execute during each event.

65. Morton Feldman, *Projection 1* (C. F. Peters, 1961).
66. Ibid.

Feldman would continue, over the next few years, to develop his "graph" compositions alongside his more traditional works, including forays into pieces for larger ensembles like *Intersection 1* (excerpted in Figure 1.13) which grants an additional axis of autonomy to performers by giving them the opportunity to place their attacks at any point in the time segments demarcated with dotted verticals.

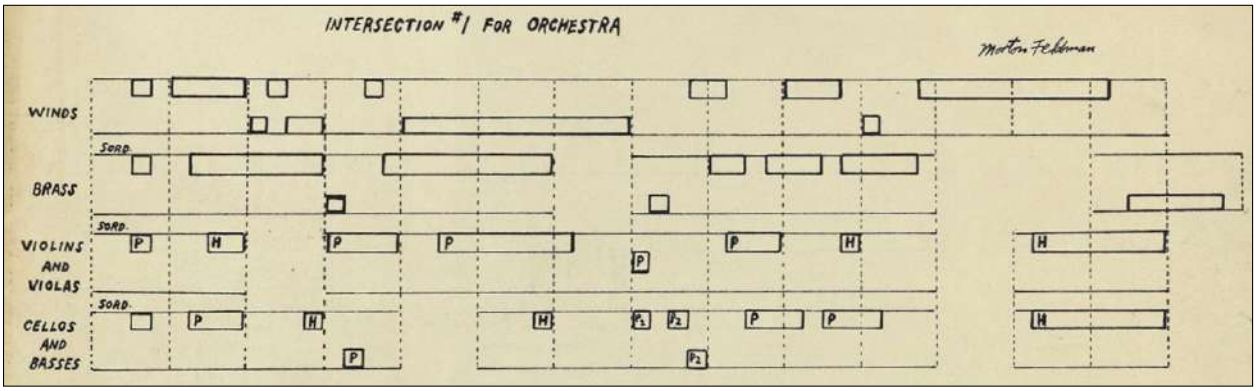


Figure 1.13: First system of Feldman's *Intersection 1* for full orchestra (1951). Another early "graphic" work.[67]

Of course, Feldman did not conceive of this new means of representation in a vacuum. His New York School peers John Cage, Earle Brown, Christian Wolff, and associate performer/composer David Tudor similarly sought musical indeterminacy via "graphic" notations during this period. However, despite the fact that these composers are frequently cited in the same breath (of which I, too, am now guilty), their motivations for and implementations of neo-notation sometimes differed greatly. Of primary note is Earle Brown's *Folio*, a set of seven pieces penned shortly after Feldman's series of works and published in 1953 which took a remarkably different tack.[68] Brown, formally trained for many years as a jazz musician, was perhaps more eager (or at least less reluctant) to, with the help of a more active interpreter, co-author his compositional efforts.[69] As such we find in *Folio* a variety of new symbolic

67. From a 1962 publication cited in Dohoney, "Spontaneity, Intimacy, and Friendship in Morton Feldman's Music of the 1950s."

68. *Folio* is now most often referenced as *Folio and 4 Systems* thanks to a more recent publication which tacks the latter piece to the end of the collection.

69. David Ryan, "Earle Brown", *The Guardian*, August 2002, ISSN: 0261-3077, https://www.theguardian.com/news/2002/aug/22/guardianobituaries.arts.

structures which vary in their familial resemblance to traditional notation. Figure 1.14 provides excerpts of the first three pieces from this series, *October 1952*, *November 1952*, and quite possibly the most-reproduced "graphic" score extant, *December 1952*.

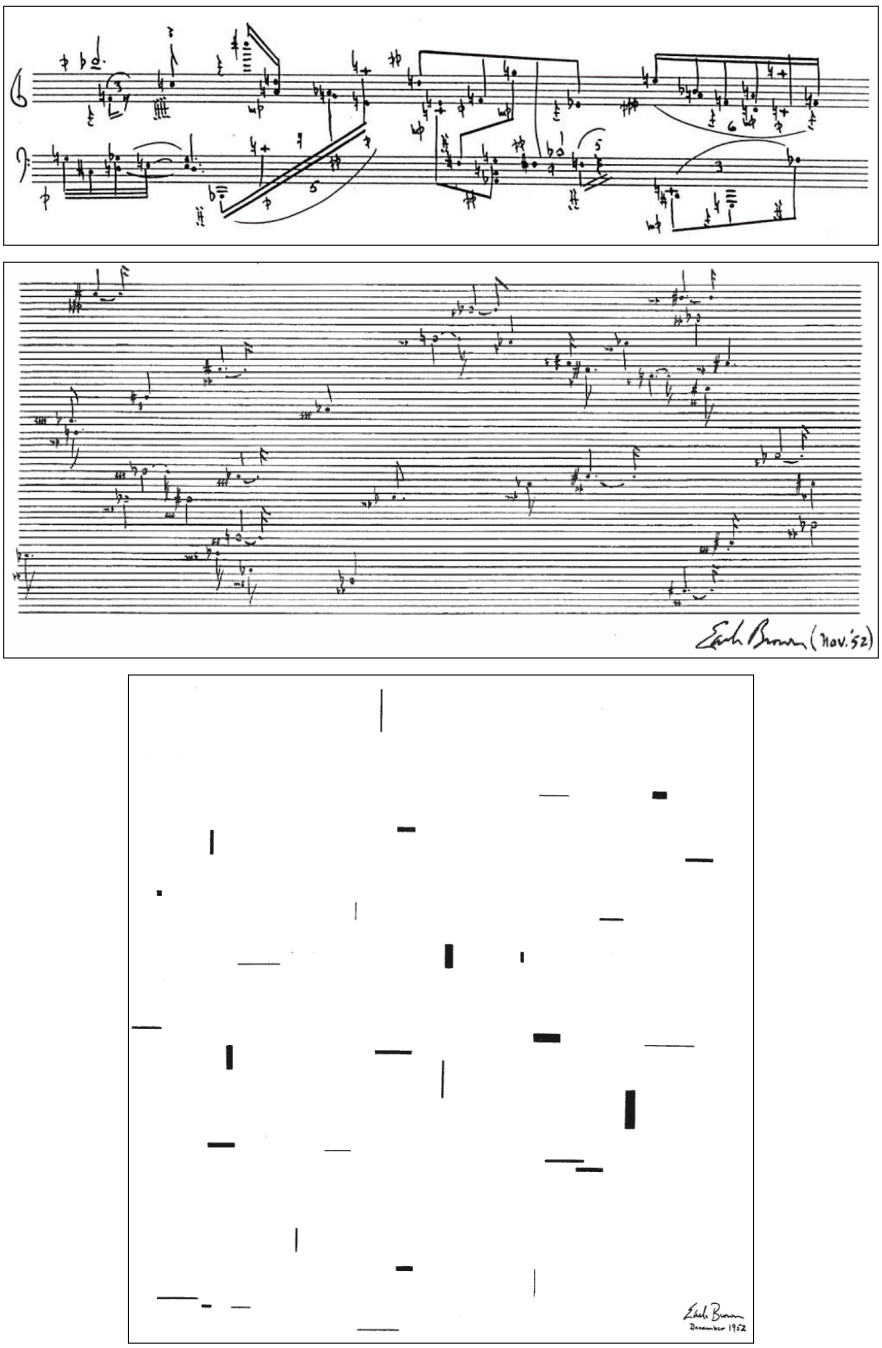


Figure 1.14: Excerpts from Earle Brown's *Folio* (1953). From top to bottom: First system from *October 1952*; Entirety of *November 1952*; Entirety of *December 1952*.[70]

That scores of this heterogeneity were composed within mere months of each other and published as one package speaks, perhaps, to the sense of newness and experimentalism that led to their creation. *October* (for piano), despite its somewhat whimsical engraving and lack of barlines, was given a standard metronome marking of ♩ = 135 and was intended to be performed "straight-ahead." *November* (marked "for piano(s) and/or other instruments or sound-producing media" and given the alternate title "Synergy") maintains at least a tenuous relationship to traditional notation in that it still employs traditional dot/stem/flag notation with accompanying dynamic markings. However, the instructions provided with the score give an entirely different perspective:

> The frequency range will be relative to that of each instrument performing the work. *To be performed in any direction from any point in the defined space for any length of time.* Tempo: *as fast as possible to as slow as possible [...] inclusive.* Attacks may be interpreted as completely separated by infinite space, collectively in blocks of any shape, or defined exactly within that space. Lines and spaces may be thought of as tracks moving in either direction (horizontally at different and variable speeds) and clef signs may be considered as floating (vertically over the defined space) [...] *The defined space may be thought of as real or illusory, as a whole or in parts.*[71]

Like Feldman, Brown permits the vertical compass of the "graphic" to map to the range of the performer's instrument. Unlike Feldman, though, who only *further abstracted* the representation of musical events in time, Brown here has shattered one of the most fundamental principles of western music notation which had held steadfast since at least the era of Guido d'Arezzo: the mapping of time to the x-axis. Play no longer proceeds *top left* → *bottom right* but rather "proceeds" in a manner entirely up to the performer's discretion. What information Brown's bespoke notation actually *provides* a performer, then, is actually rather vague. Horizontal lines which typically demarcate precise pitch quanta have become indefinite signifiers of "vertical" distance. The notes' forms (shape, stems, flags) have, in light of his careful instructions, become virtually empty of concrete meaning. We might assume that, insofar as they remain unmentioned in the notes, dynamic markings are meant to be observed

70. Earle Brown, *Folio and 4 Systems* (Associated Music Publishers, November 1986), 2–8, ISBN: 978-0-634-03808-2.

71. Ibid., 1.

"as written"—in which case they would serve as the sole fixed parameter in the piece save the number of attacks. Even without consulting firsthand accounts of the piece's creation; taking this evidence together it becomes clear that Brown has begun centering the "visuality" (or "aesthetic," if you like) of his glyphs over and above any denotative symbolic value they might otherwise provide. In a crucial inversion, this visuality now drives the sound-concept and the production of sound—completely contrary to the traditional state of affairs where a composer chooses symbols for their denotative content in order to bring about a desired sound-concept.[72] This new orientation toward the visual promptly reaches its apotheosis in *Folio*'s third piece: *December 1952*—by far Brown's most well-known work. Having been inspired by Alexander Calder's "mobile" sculptures which bear no one consistent visual trace, Brown writes (emphasis his):

> The performer was asked to consider these [graphic] elements in this manner only at the moment—and they could be changed continually [...] So, *December 1952* was generated from that very early concern with trying to create something which was a *score* comparable to a visual mobile.[73]

While it is often spuriously claimed that *December* was proffered entirely without performance directions in a sort of Dadaist flourish (frequently by authors who ought to know better), in fact at the time of its 1953 publication its instructions reproduced in full read thus:[74]

> The composition may be performed in any direction from any point in the defined space for any length of time and may be performed from any of the four rotational positions in any sequence. In a performance utilizing only three dimensions as active (vertical, horizontal, and time), the thickness of the event indicates the relative intensity and/or (where applicable instrumentally) clusters. Where all four dimensions are active,

72. Certainly, a number of earlier examples could be said demonstrate a sort of privileging of notation's aesthetic in composition—most notably minor composer Baude Cordier's "Belle, bonne, sage" which renders a fifteenth-century chanson in the shape of a heart. Even Telemann, in his *Gulliver Suite* experimented with "eye music" which similarly wrapped conventional sonic products in a visually arresting package. These, while of limited historical interest, do not, to my mind, prefigure the explosion of new "visual composition" in mid-twentieth century.

73. Earle Brown, "On December 1952," *American Music* 26, no. 1 (2008): 1–12, ISSN: 0734-4392.

74. Inexplicably, Paul Griffiths makes the claim that of indeterminate scores, *December 1952* was "at once the earliest, the most enigmatic (there being no instructions about how these shapes are to be realized as sound)" found in Paul Griffiths, *Modern Music and After*, 3rd edition (New York: Oxford University Press, February 2011), ISBN: 978-0-19-974050-5

> the relative thickness and length of events are functions of their conceptual position on a plane perpendicular to the vertical and horizontal planes of the score. In the latter case all of the characteristics of sound and their relationships to each other are subject to continual transformation and modification. *It is primarily intended that performances be made directly from this graphic "implication" (one for each performer) and that no further preliminary defining of the events, other than an agreement as to total performance time, take place.* Further defining of the events is not prohibited however, provided that the imposed determinate-system is implicit in the score and in these notes.[75]

Here Brown helpfully provides for two distinct modes of play. The first (in my experience the most frequently adopted method) retains the overall strategy described in *November*, only with the piece's glyphs abstracted one degree further from traditional notation; indicating duration with horizontal extension and dynamic with stroke thickness rather than a ***pp***/***ff***-style glyph. The second, perhaps more opaque option has the performer imagine a virtual plane extending from the page. What appear to be two-dimensional rectangles are actually projections of three dimensional objects at various distances from the viewer along this z-axis. In either case, Brown makes clear that no preconceived direction-of-play is meant to obtain and that the page may be rotated in any of the four cardinal orientations pre-performance.

We should note that where earlier improvisation-oriented scores left the precise boundaries of their openness (i.e. the breadth and depth of notation's fields of potential) up to the training and good taste of their performers, Brown (and to a lesser extent Feldman) take great pains to reify these boundaries in prose to be considered prior to performance. By explicitly granting performers the opportunity to choose between multiple interpretive schemes, Brown forges a new sort of relationship between composer, performer and score—one conveyed not through traditional pedagogical/experiential channels but one defined *in situ* by the composer himself.

I have taken, perhaps, a disproportionate amount of time to discuss these early neo-notational works (despite the fact that Feldman quickly abandoned these "graphic" forays in favor of a return to traditional work which only *felt* improvisatory) for one important reason:

75. Brown, *Folio and 4 Systems*, 1.

By way of these first forays, these two composers, Feldman and Brown, have articulated (albeit imperfectly) the primary paradigmatic rupture between two classes of open "graphic" scores which persists in some form to the present day. We might sum up this coarse division in the following tree diagram (Fig. 1.15):

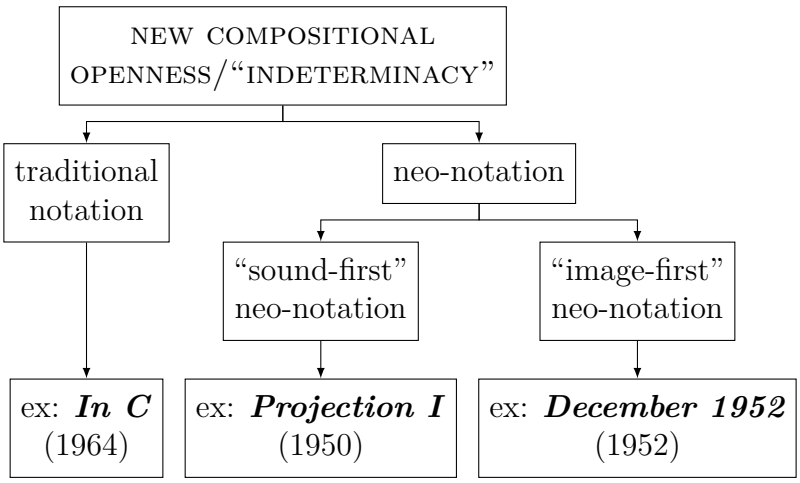


Figure 1.15: One articulation of notation paradigms during the ascendance of new open musics in the mid-twentieth century.

Works which seek to explore new (or indeed return to old) open forms fall into two broad categories: those which modify (often by paring down) traditional notation and those which introduce new notations for the purpose. Though there is certainly more nuance to be found than is represented here, this latter group tends to divide into two ideologically distinct further categories: Scores which begin from sound- (or process-) concepts which hope to attain an imagined sound world or creative procedure via a novel method of encoding (i.e. "sound-first") and those which hope to elevate some visual object (e.g. *December 1952*'s line-segment array) to the status of a *sounding* object; posing it to the performer(s) as an open question of interpretation (i.e. "image-first").[76]

These two approaches are drawn into even more stark contrast when one considers

76. Of course, this could never be a hard-and-fast boundary. There is no reason to imagine that Feldman wasn't to some degree motivated by the sheer novelty and appearance of his new symbolic language or that Brown did not hear an abstract *klangwelt* in his head which motivated *December*. Based, though, on Brown's repeated appeal to visual inspiration and metaphor, I think this is a reasonably safe, if blunt, assessment.

their underlying motivations. It is telling that by 1954, Feldman had entirely abandoned his prolonged experiment with graph (his term) scores, evidently on grounds that they "liberat[ed] the performer" to too great a degree. While his scores achieved their initial goal of allowing for an unpredictable, non-replicating sonic trace which did not rely on his particular tastes, habits, and conditioning, Feldman was clearly dissatisfied with the extent to which his performers' creative autonomy crept into the works.[77] Despite an errant indication in his graph score *Marginal Intersection* (1951) for a player to perform a line "as in a jazz ensemble," Feldman clearly did not share in the ethos of jazz musicians who, too, deployed novel notation mechanisms in order to promote a new form of open music.[78]

This jazz-avoidant (occasionally jazz-hostile) orientation among America's hypermodern art-music composers forms one of the primary motivations behind George Lewis' much-cited paper "Improvised Music after 1950: Afrological and Eurological Perspectives" and certainly extends to John Cage who, even more frankly than Feldman, denounced the creative processes underlying jazz improvisation, distancing his own "indeterminate" works from it whenever possible. Lewis hypothesizes that despite this consistent denunciation, the performance practices which emerged during this period of New York School flourishing are inextricably bound up in the radical musical advances made by America's *other* modernist school of composition: jazz (bebop in particular—not coincidentally also "headquartered" in New York City during the 1950s). Lewis sees this reluctance to own up to the clear parallels between these two open musics as essentially rooted in a creeping form of anti-Black racism which tainted the artistic efforts of Black Americans as ineluctably low-brow, unserious, or backward-facing.[79]

To be sure, not to say every New York School associate was equally dismissive of the Afrological avant-garde. Earle Brown himself, a professional jazz trumpeter prior to his turn toward concert music, speaks candidly of the extent to which jazz performance practice

77. Taruskin, *Music in the Late Twentieth Century*, 99.

78. Dohoney, "Spontaneity, Intimacy, and Friendship in Morton Feldman's Music of the 1950s."

79. George E. Lewis, "Improvised Music after 1950: Afrological and Eurological Perspectives," *Black Music Research Journal* 22 (2002): 215–246, ISSN: 0276-3605, https://doi.org/10.2307/1519950.

motivated the form and content of his open works. From a 1991 interview:

> - **BD (Bruce Duffie):** Was the notation your own, or was the notation borrowed from other people that discovered it first?
> - **EB (Earle Brown):** No, it was completely my own. I first started doing these things in 1951 and '52, and what occurred to me, from a jazz background, was the freedom and the flexibility that jazz has from performance to performance.
> - **BD:** Yes. They're never the same. They're improvisatory.
> - **EB:** They're never the same twice. But if you play *How High the Moon* seventeen times, you know that it's *How High the Moon*, even though it's never, in detail, the same twice. That excited me.
>
> ---
>
> - **EB:** [...] But what occurred to me as an ex-jazz musician was why can't the variations be a function of the interaction of the musicians with the material that I have composed? One of the greatest things about jazz is the instant, instantaneous communication. One played [sings a line] and then the other one goes [sings an answering line]. It's like you and I having a conversation where we exchange ideas. That's always one of the most beautiful things to me about jazz. So that's what I tried to introduce, and this goes all the way back to your first question — why new notation, and why the scores look different than other people's scores. It's because I want to introduce the possibility of the musicians not only playing what I write, but interacting like a human family of friendly people.[80]

Here, Brown highlights that crucial aspect of jazz performance cited in the previous section: the seemingly infinite malleability of its work-concepts. Given that Brown undoubtedly experienced this malleability via the same notation mechanisms jazz players employ today (i.e. via open melodies and chord symbols), I think it is no great logical leap to suggest that this "Afro-diasporic return" to open forms significantly impacted his decision to ground his music in a new notation. While Brown's frankness with regard to this line of influence appears to be the exception rather than the rule, it nevertheless serves to illustrate productive cross-talk between these two musical paradigms—an important byproduct of which were the notation schemes at the heart of this research.

80. Bruce Duffie, *Composer Earle Brown: A Conversation with Bruce Duffie*, 1991, http://www.bruceduffie.com/brown.html.

1.8 Conclusion

With greater and greater intermingling of ("classical," "jazz", "free improvisation") art music spheres in the twenty-first century, more open scores are being composed today than ever were during the 1950s and '60s. The large-scale "democratization" of the avant-garde thanks to art's newfound accessibility on the internet has led, I think, to a measure of mainstream acceptance of the viability of the open score as part of the art music landscape. Even "mainstream" institutions now occasionally admit these radically open works into their repertoire (albeit usually those by the now-venerated New York School composers themselves). Given that we are at a local apex of the production and consumption of notation-mediated open music, and given that the variety of o/aural-literate traditions underpinning the creation of these works is now more diverse than ever, the comparative lack of rigorous analysis and critique of these fascinating works is somewhat startling. When discussions of notation-mediated open music *do* appear (either in lay-facing publications or in "the literature"), authors often demonstrate a lack of interest in investigating precisely what sets one open work apart from the rest.

That is to say: despite the fact that "graphic score" and "graphic notation" are common terms of art familiar to anyone who has completed a college-level music history sequence, these terms are wholly inadequate to describe the broad swath of notation-mediated open musical works. I take it that there is an important difference-in-kind between these "image-first" (by far the most prevalent and most-discussed form of open "graphic" scores) and the often more intellectually knotty but lesser-appreciated "sound-first" open works. These two broad categories display radically distinct initial motivations, construction methods, performance phenomenologies, and attendant structures of performer/composer agency. There have been very few concerted attempts to elucidate these differences, to categorize works *according* to these aspects, to taxonomize the varieties of open musical work, or to highlight trans-historical parallels between these and other musics.

The following chapter will take on the much-needed task of (a) describing in more detail the varieties of notation-mediated open music in terms of these motivations, methods, structures

of agency, etc., specifically focusing on these under-discussed "sound-first" composition techniques and (b) addressing the few incisive scholarly efforts which lay the foundations for a greater understanding of these works.

CHAPTER 2

TOWARD A RICHER TYPOLOGY OF (OPEN) NOTATIONS

> "The existence of mixed forms does not, however, mean we should blur the division between 'sign' and 'illustration.' On the contrary, the fact that the sign component can be separated from the graphic aspect [...] is itself a demonstration that we are dealing with two fundamentally different categories."
>
> György Ligeti, 1965

In the previous chapter, I used a rapid historical gloss to illustrate an important narrative arc in Western art music's technological development. Specifically, I aimed to chart the ebb and flow of notation's relative sonic determinacy—the openness and fixity of our shared musico-graphic signs. While much of this effort was dedicated to tracking changes in the common practice notation serving as most literate musicians' lingua franca, the final section of the chapter addressed a few of the varieties of new notation which seemed to spring up *ex nihilo* in the 1950s and 1960s. To my mind, the most interesting and under-analyzed of these and subsequent new notations feature robust encoding schemes which provide specific shape and color to a musical work—while at the same time permitting a great deal of creative latitude on the part of the work's interpreter(s).

This chapter is ultimately intended to address the analytic issues posed by the arrival of these bespoke "open" notations and to move toward new ways of thinking about their form and function which avoid the murky, obscurant language often featuring in their discussion. To wit, the specific goal I have set for this chapter is the development of a working typology of notations; one able to fold in the variety of traditional methods of music encoding, but one specifically aimed at disambiguating the variety of extant open notations so prevalent in the composition of the twentieth and twenty-first centuries. Only so armed may we then begin to make sense of the more complex open works which spurred on this research—works which may operate on many simultaneous levels of fixity, employing several different encoding schemes over the course of a single piece, a single section or a single measure.

To that end, I'll begin by discussing what I take to be the most pressing issues facing

our clear-eyed assessment of music notation, moving from most general to most specific. Specifically, I'll first address our "common-sense" notion of notational semantic content; putting forward a new way of thinking about notation-as-symbol so as to find a shared vocabulary with which to discuss both traditional and neo-notation on the same terms. Next, I'll interrogate concepts of openness in music composition; specifically highlighting common takes on the "open work," generally, and on "graphic notation," which I take to needlessly complicate our understanding of this notation's function. Following this, I will highlight those few scholarly efforts which seem to take positive steps toward our goal—with special emphasis on a critically under-cited essay which I think does a great deal of the work in describing our desired typology. Ultimately it is this source which I'll use to catalyze the development of a refined model.

2.1 Base-level function of music notation

> In music notation, sounds are represented by small circles (or ovals) called notes. Notes can be high or low, and they can be short or long. The higness [sic] or lowness of the note is its pitch. To represent high and low pitches, notes are placed high or low on the staff, the five horizontal lines going across the page.[1]

> Notation is a recognised system of symbols (essentially marks on paper) that visually represent a music or sound idea. Standard notations are well-known, clearly defined structures that are able to communicate sound information in a functional and precise manner.[2]

> Printing music on a page allows a composer to convey information to a musician who will ultimately perform that composer's work. The more detailed the musical notation, the more precise a performer will be. In this sense, musical notation is no different from printed text.[3]

1. Sienna M. Wood, *Introduction to Music Notation*, 2015, https://www.musiccrashcourses.com/lessons/notation%5C%5Fintro.html.

2. Debbie Lyddon, *Notations – seeing sound*, May 2015, https://debbielyddon.wordpress.com/2015/05/18/notations-seeing-sound/.

3. Masterclass, *Music 101: What Is Musical Notation? Learn About The Different Types of Musical Notes and Time Signatures*, June 2021, https://www.masterclass.com/articles/music-101-what-is-musical-notation-learn-about-the-different-types-of-musical-notes-and-time-signatures.

As promised, I would like to begin by revisiting a few of our initial assumptions given at the beginning of the last chapter, specifically as regards the foundations of the function of music notation and of its potential to mediate musical performances. The ability to meaningfully consider complex new works which often combine several distinct varieties of notation in a single score is entirely contingent on an understanding of what, at a basic level, these notations are doing—i.e. what they encode and transmit.

I provide the above inscriptions as an interesting sampling of the variety of extant definitions of "music notation." These public-facing, decidedly non-academic definitions were specifically chosen for the way they seem to get at the ambient, unexamined sense of what it is we use notation *for*. It is particularly interesting to note their discrepancies: The first takes notation to directly refer to sounds—though it is unclear whether these are meant to be virtual or real—and makes sure to include the mapping between spatial dimensions on the page and height in frequency space. The second mentions "music-" and "sound-ideas" as potential referents for notation, though does not go into detail as to their differences. Here, notations are structures for the communication of this sound data from composer to performer such that the performer, having formed a clear mental image of what sound the composer is seeking, will be able to bring it into being. The third, on the other hand, does not refer to sound at all. Like the second, it emphasizes that notation is a means of information conveyance between a communicator and communicatee. However, precisely what *sort* of information notation actually bears is left unspecified. Interestingly, it also immediately appeals to our notion of precision—implying that there exists some ideal virtual music toward which notation aims; carrying with it the implicit goal that performers should get as close to it as possible. These represent three distinct ways of thinking about our everyday interactions with music notation—none of which, alone, allow us to describing using uniform vocabulary the manifold forms of notation we observed in the last chapter.

David Gutkin, in a paper I'll return to later in this chapter, hints at a sort of solution:

> But might not any musical notation and not solely particular avant-garde scores or tablature be understood as the prescription of action rather than, or at least as well as the coding of sound? Even if notation does not always mimetically or analogically depict physical movements *per se*, culturally significant graphic marks are only ever operative as imperatives to act.[4]

In the following section, I will argue for just such a model of notation-interaction—one which de-centers common notions of sound-signification in favor of mediation of fields of potential musical action. The aim of this model is not to replace common parlance or overturn centuries of received wisdom pertaining musical inscription at large, but rather to enable a more precise discourse—especially as regards complex, multiform neo-notation that characterizes so many fascinating works today.

2.1.1 Notation as imperative to act

To begin with, I will refer back to Mieko Kanno's definition with which we began the previous chapter. Per Kanno, music notation serves generally to "describ[e] musical works and giv[e] specific instructions for them to be realized." Earlier, I refined (genericized) this definition slightly by allowing that music notations merely be coherently "oriented toward an existing [...] or virtual [...] musical product" given that there exist many music notations which were never intended to allow for realization of a work (Rainer Wehinger's famous *ex post facto* "graphic" score for György Ligeti's *Artikulation*, for instance). While these definitions served as a good launchpad for our discussion, neither of them give any idea as to the mechanism by which notation "describes" or is "oriented" toward sonic products. Though the article itself is fairly comprehensive, the head-line definition in the *Grove* entry for "Notation" is similarly vague. For its primary author, Ian Bent, notation taken whole is simply some "visual analogue of musical sound, either as a record of sound heard or imagined, or as a set of visual instructions for performers."[5] Elegant, broad-level definitions like these necessarily fail

4. David Gutkin, "Drastic or Plastic?: Threads from Karlheinz Stockhausen "Musik und Graphik," 1959", *Perspectives of New Music, Volume 50, Winter/Summer 2012*, https://muse.jhu.edu/article/778105/.

5. Ian D. Bent et al., *Notation*, 2014, https://doi.org/10.1093/gmo/9781561592630.article.20114.

to get us any closer to an understanding of the objects to which elements of music notation actually refer. For that, we must turn to discussions of notational semiotics. Luckily, a good starting point is not far away. In a later section of the article, Bent elaborates:

> A musical notation requires, in essence, two things: an assemblage of 'signs' and a convention as to how those signs relate to one another. A written musical notation requires further a spatial arrangement of the signs on the writing surface that makes a 'system' of the assemblage; it is this system that forms an analogue with the system of musical sound, thus enabling the signs to 'signify' individual elements of it.[6]

This strikes closer to the heart of the question. Here Bent establishes the position that music notation (taken whole) serves as a "visual analogue" of actually-existing music. A system of notation comprises signs (what I've been generically calling "glyphs") and a syntax through which those signs are perceived and understood. Implicit in Bent's argument, though, is the assumption that the sound-system's referents (signified by the assemblages which form our notations) are *themselves* sounds.

To clarify: Per the paradigmatic "standard" model of composition: A composer conceives of music in some way and represents it in a score, then hands it off to a performer who creates music using the score as a sort of "recipe," hopefully satisfying everyone in the process. Semantically speaking, though, the score serves as a sort of black box of representation—while it's clearly desirable that a score (as an individual entity) should bear some representative orientation toward some body of sound, either past, future, or potential, it is not altogether trivial precisely what the composer is encoding and sending and precisely what the performer is receiving when this process of representation takes place. Given the definitions we've seen, one might naïvely imagine that (i) a composer simply conceives of "pure sound," in some arrangement, (ii) determines which symbols from his repertory would be best to represent that sound and commits them to paper, after which (iii) a performer interprets these symbols—similarly taking them as signifying particular sounds which they must dutifully bring into existence. The performer then realizes these sounds of the type and ordering the composer intended and everyone is happy. This model, however, has some critical flaws which

6. Bent et al., *Notation*, Section II.1.

expose the inadequacy of the notion that music notation somehow represents sound in the way that a noun represents a person, place, or thing.[7]

First, it is often the case that a composer does not intend a particular sound at all, but what we might generically call a "process"—for instance some harmonic function. If I write $B^{\flat-7}$ on the lead sheet I'm composing, it's not because I'm imagining some particular sound, but because I desire harmonic functionality of a particular form from my rhythm section or soloist. Fulfilling that harmonic role faithfully could yield any number of resultant sounds—any of which would satisfy the composer. Similarly, a composer might intend not a sound, but a particular sort of physical gesture *irrespective* of what sound results. Figure 2.1 illustrates an excerpt culled from Helmut Lachenmann's brilliant *Pression* for unaccompanied 'cello, which, per Paul Griffiths "is typical of Lachenmann's work of this period in its concentration on irregular techniques, and thereby on the physical mechanism by which the sounds are produced." Here, we see his novel proportional notation which specifies the non-sounding movement of the left hand separately from the sounding movement of the bow. Given that an audience member three rows back from the performer may not even be able to hear the thin, breathy sound emitted, it is not too far flung to imagine that Lachenmann penned this gesture for the theatricality of its movement rather than for the precise attributes of its sonic byproducts. Here, neither the intent nor that which is transmitted by the notation is sound proper.[8]

7. Let us be clear that sounds (as they actually exist) are physically- and temporally-extended *things*—highly complex and specific in form. I take it that even the strictest "sound-semanticist" would not argue that the familiar glyphs on the page are meant to refer to some *specific* sound (e.g. of the form {A442 at 80dB begun March 9th 1972 at 14:30:26 and ending March 9th 1972 at 14:30:27.5}. Rather, I take it that they would argue that the symbol on the page directly refers to some internally-audiated sound which bears a reasonable resemblance to some sound *also* familiar to the performer.

8. Griffiths, *Modern Music and After*.

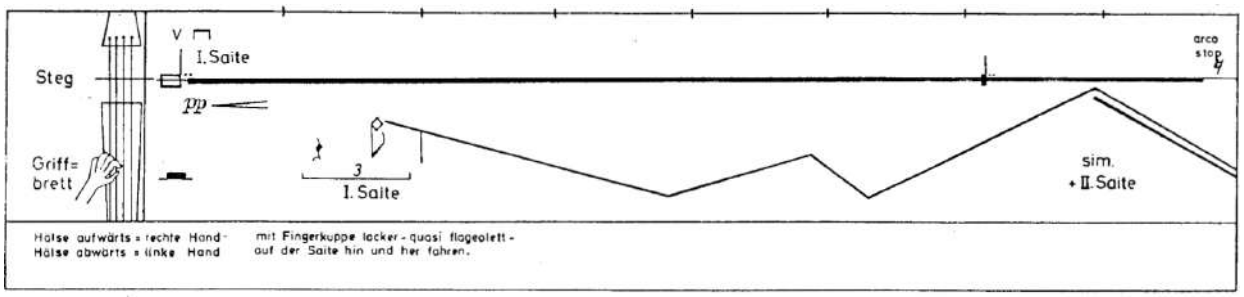


Figure 2.1: First system of Helmut Lachenmann's *Pression* (1969) demonstrating non-sounding gestural notation (lower jagged line) which modifies sounding notation (upper solid line).[9]

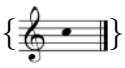
Indeed, especially in contemporary music there are many such symbols which clearly yield sound via their interpretation but for which we would struggle to clearly identify a sonic referent. What "sound" is indicated by a figured-bass symbol? Likewise, what "sound" is indicated by the boxes in Feldman's *Projections* series? The rectangles in *December 1952*? Further, if notation is to refer specifically to concrete sounds it becomes non-trivial to define the inner workings of "more fixed" or "more open" notations—categories which clearly function in practice. Sound (at least under our common usage of the term), whether imagined or issued, cannot be any more or less fixed than it is. A sound is merely an end product of the process notation inscribes. Simply put, our common-sense understanding of notation's "fixity" or "openness" can not obtain if we take notations to formally refer to sounds proper. In this light, I would like to tentatively put forward an alternative model of notational semantics in order to facilitate discussion of the open works at the core of this project. The following is a semi-formal elaboration of my argument:

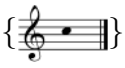
– Music notation is typically used to generate or archive music. It seems correct that music notation, properly arranged, should by and large *represent* in some way its resultant musical products (i.e. virtual or actually-existing sounds). A score—some meaningful, cohesive

9. Helmut Lachenmann, *Pression* (Wiesbaden, Leipzig, Paris: Breitkopf & Härtel, 1969).

arrangement of notation—serves as a "recipe" allowing for the creation or recreation of an imagined complex of sounds extended in time. We might think of the score, its encoding procedure, and its resultant (or potentially resultant) sounds as together forming a conceptual whole. An important misconception which might arise from this ***score → music*** mapping, though, is that individual glyphs *congruently* map to individual sounds—i.e. that there exist one-to-one mappings between units of notation and the expected sounds which ought to result from their reading.

– During the encoding process, symbols are chosen by a composer (from a repertory of such symbols) on the basis of their results—i.e. the sounds, gestures, or procedures which would result from their interpretation. However, we should be very cautious about making the claim that the symbols are chosen because they necessarily *refer directly* to some desired sounds.

– The score's downstream sonic products, after all, only result in practice via some interaction (be it a tight or a loose reading) between a performer and the notation provided by the composer. The performer's body and instrument stand between score and sound—thus the glyph {  } in practice does not "neutrally" stand in for some platonic, un-sounded C5, but rather results in a C5 as brought into existence by some sounding body. As a convenient shorthand, we think of it as referring to raw pitch data, but insofar as we are discussing notation oriented toward *performance*, this is not the case.

– For instance, it should be unambiguous that the individual note-glyph {  } does *not* refer to a sound. Given the traditional understanding of how music notation syntax works, there's not enough information to reproduce a particular imagined sound from the information given. However, in many literate music traditions, perfectly valid scores might be constructed entirely of such "bare" notes, as is the case with many of the works in Anthony Braxton's "Ghost Trance Music" series (see Figure 2.2).

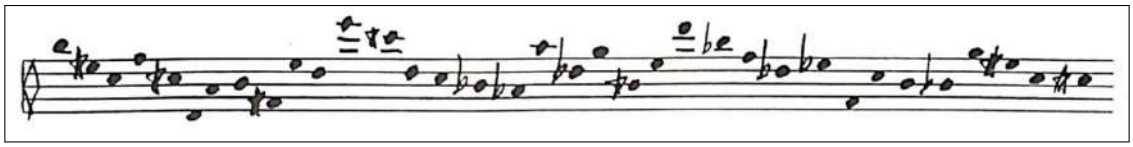


Figure 2.2: Excerpted system from Anthony Braxton's *Composition No. 193* which features long stretches of unadorned noteheads and bespoke "diamond" clefs and "star" accidentals.[10]

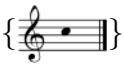
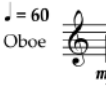
– One might assert instead that notation refers to specific sounds only when enough clear information is provided (per the rules of our system as we understand it) to fulfill the "recipe" with a particular instrument and with a particular tempo and dynamic. After all, I can much more clearly imagine the sound which would result from {♩ = 60 Oboe *mp*} than from its unadorned cousin.

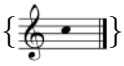
– Unfortunately, this is still an insufficient model. Humans cannot realize symbols identically each time; even with this greater degree of specificity, there will always be discrepancies (even large discrepancies) between repeated realizations. Each symbol or complex of symbols either explicitly or implicitly carries with it a degree of latitude as to what constitutes a valid or acceptable realization. {♩ = 60 Oboe *mp*} might be cut off 20 milliseconds short of the mathematically called-for duration, it might be flat or sharp by 10 cents, it might be slightly louder or softer, it might be performed with light or no vibrato, etc.

– It is therefore impossible to point to any particular sound which serves as the referent for any complex of music-notation symbols. As such, I would like to propose an alternative model; specifically, one in which notation's referent is instead conceived as a virtual set of sound-producing actions which could plausibly result from the notation's rendering in performance. In the previous example, the glyph-complex {♩ = 60 Oboe *mp*} would refer to a set which includes all of the given potential realizations as well as any others which would

10. Reproduced courtesy of Kobe Van Cauwenberghe, "A ritual of openness. The (meta-)reality of Anthony Braxton's Ghost Trance Music", *FORUM+* 28, no. 1 (February 2021): 48–57, ISSN: 0779-7397, https://doi.org/10.5117/forum2021.1.vanc. Due to the complex nature of Braxton's graphic titles, I will be abbreviating them as necessary with his self-imposed catalog numbers.

be considered faithful. I'll use the term "field of potential" (FOP) to refer to this set of appropriate realizations which serves as the referent to a notational glyph.

– As such, we no longer need to adorn a bare {  } (which would and has served as a structurally-complete notation all by itself) with all of these other symbolic trappings (dynamic, tempo, etc.) in order to meaningfully describe a referent for a particular glyph. The bare C5's referent, in other words *contains* the referent of { 

} as well as any other potential realization of {  }.

Of course, this argument itself raises some important questions. What, first of all, defines the scope and content of this field of potential action? If we are to suspend our notion that somehow notational glyphs map one-to-one with intended sounds, we must at the same time adopt a new model of how notation-mediated communication *works*. As with any semantic content, notation's field of potential is multiply determined via a complex of (i) the "encoder's" intent, (ii) the code regulating the sign's usage, and (iii) the recipient's reading of the sign. On the part of the composer, the FOP is defined by some intentional *sound- or process-concept* (S/PC) which he encodes to the best of his ability using the glyphs at his disposal. Under this model, the process (for a typical sound-concept) proceeds as follows:

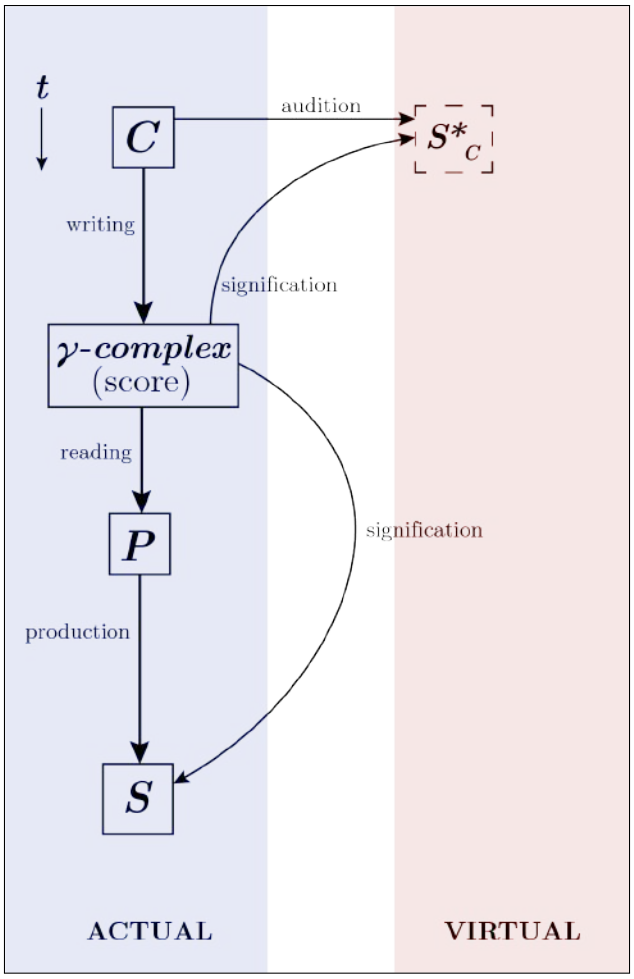
- A composer internally audiates a sound for oboe, based on his past experience of "oboeness," (i.e. develops a sound-concept) and decides to encode it for a performer to reproduce.
- He must then ask himself two things:
  1. Does the chosen glyph's implied FOP include the sound he has audiated?
  2. How much discrepancy between his audiated sound and the actual performed sound would be permissible?
- If the chosen glyph's FOP contains the imagined sound *and* allows only for permissible discrepancy given the established code agreed upon by composer/performer, then the glyph suffices.
- If, on the other hand, the glyph's FOP contains the imagined sound, but the potential discrepancy between audiated sound and performed sound is too great, the composer must further *restrict* the FOP in some way—either with additional symbolic modifiers (***mp***, ♩=60, etc.) or with verbal/textual instructions.

Crucially, this procedure holds true independent of the degree of fixity inherent in the system of notation. If music notation were to somehow point to sound directly, we would have to posit entirely different modes of signification between "closed scores" which refer directly to fixed, predictable virtual sound and "open scores" which grant the performer some degree of latitude in realization. That certain notations, be they systems or individual glyphs, permit more leniency in interpretation (i.e. are more open) should be uncontroversial. This being the case, though, we would need a way of describing the represented sound as *itself* being more or less definite depending on whether its associated sign were open or closed—ultimately an unenviable position when compared with the simpler alternative. I have prepared two "flow" diagrams illustrating the standard composer/performer interaction—one under the "naïve" model (Fig. 2.3) and one under my amended model (Fig. 2.4). Translations of the relevant relationships follow the figures.[11]

11. A couple of caveats for these interaction charts: First, this is meant to be a model illustrating the simplest possible composer/notation/performer interaction—it does not purport to represent *all* such interactions. In practice, obviously, there are complex feedback mechanisms (e.g. player feedback in rehearsal, inter-musician communication, etc.) which would change the whole interaction structure.

Second, this is meant to be an interaction between a composer and a *single* performer. The model could just as well be expanded to include an arbitrary number of agents but for the purposes of illustration I thought it best to keep things as simple as possible.

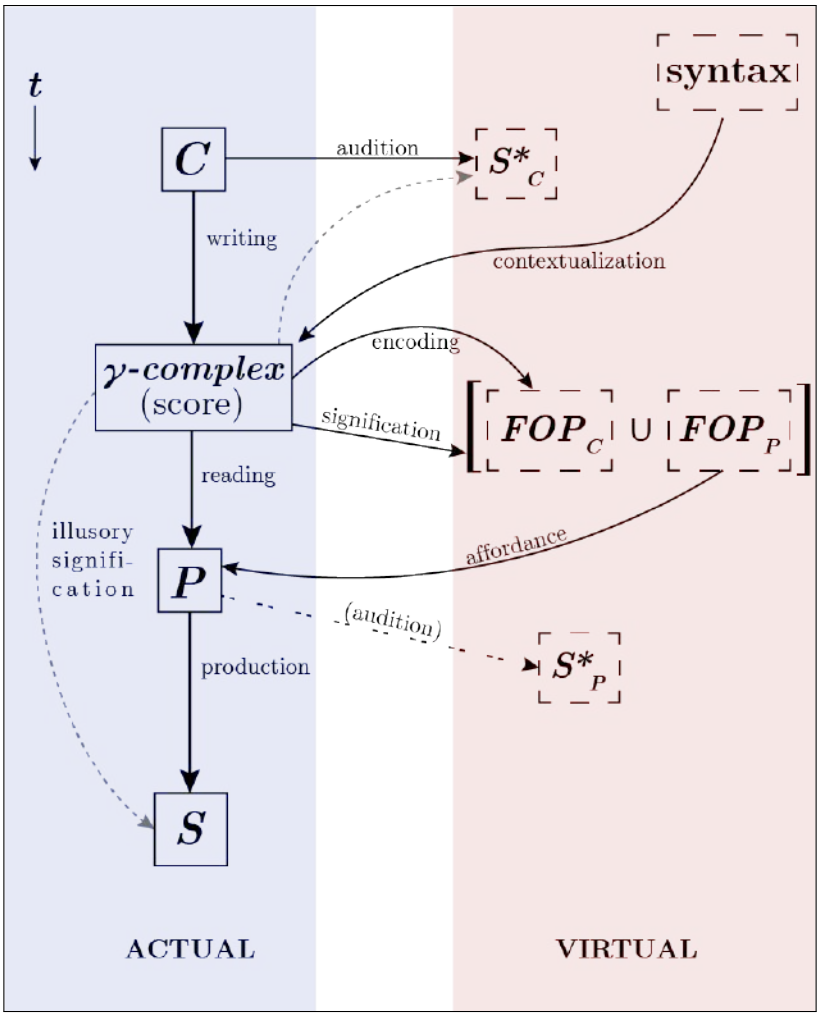
Third, I marked $\boldsymbol{S}_{\boldsymbol{P}}^{*}$ optional for the fact that, it seems, we could conceive of a scenario where the performer "mechanically" reproduces notation which they are capable of executing but which is too complex to audiate inwardly. Alternately, the composer may have encoded a process-concept which is likewise reproducible by the performer but which is so opaque it fails to reveal itself conceptually. In either case, a "reflected" sound/process-concept is not strictly necessary for the model; hence the broken line.



"Naïve" Process

1. A composer (C) **audiates** a sound-concept (S^*_C) which s/he wishes to realize in sound.
2. S/he **writes** the score—a complex of glyphs (γ) intended to yield the imagined S^*_C at some future time.
3. A player (P) **reads** the score, forming a mental image which matches that devised by the composer (S^*_C).
4. P then **produces** corresponding sound S.
5. To the outside observer, $\gamma - complex$ **represents** the final sound S produced as well as the sound concept S^*_C originally devised.

Figure 2.3: "Naïve" notation interaction model.



Amended Process

1. Syntax **organizes** the whole interaction and is familiar to both composer (C) and performer (P), whether it is part of the received structure of music notation or newly communicated in the score.[12]
2. C **audiates/devises** some sound/process-concept (S^*_C) which he would like to hear P perform.
3. C **writes** the score—a complex of glyphs (γ-complex)—such that their realization might bring about an instance of S^*_C. (That is, such that a field of potential $FOP_C(\gamma) \Rightarrow S^*_C$ where "$\Rightarrow$" is a relation meaning "fulfills").
4. P **reads** $\gamma - complex$, which affords him/her FOP_P.
   (a) To an outside observer, C's $\gamma - complex$ can then be said to represent the union of FOP_C and FOP_P.
   (b) P may him/herself **audiate/devise** S^*_P such that $S^*_P \approx S^*_C$, though it's not strictly necessary.
5. P executes $\gamma - complex$, selecting a gesture g (such that $g \in FOP_P$), which **produces** sound.

Figure 2.4: Amended notation interaction model.

Per my earlier comment, it should go without saying that this amended view of notation-signification is not meant to supercede the common-sense way we talk about or interact with notation in the course of our everyday musical experiences. Instead, couching the content and function of notation in terms of fields of potential action should allow us to assess complex, multi-notational works (for instance, Anthony Braxton's *Composition No. 76* excerpted in Fig. 2.5) with greater clarity; a task I'll be attempting in Chapter 3.

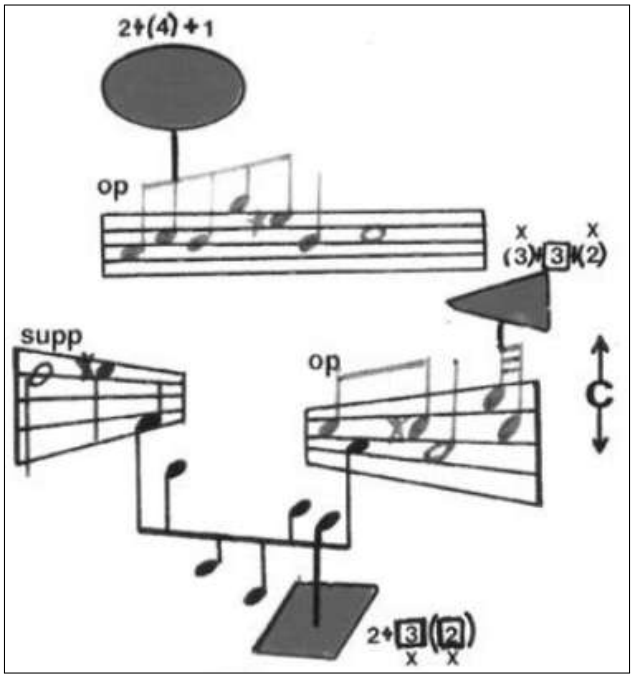


Figure 2.5: Excerpt of module "E3" from Anthony Braxton's *Composition No. 76* (1978) demonstrating multiple concurrent forms of notation operating at several degrees of openness and semanticity.[13]

12. One final qualification: Where elsewhere I have attempted to be as precise as possible when choosing the language with which to describe these notation-interaction models, here I have somewhat callously included the catchall module labelled "syntax" as a way of hand-waving the many *a priori* factors which influence the way notation is used to encode/decode music. To be more specific, I take this "syntax" to be a global variable comprising, for instance, (a) the extent to which the composer and performer were formally trained in the use of the notation scheme, (b) their musical upbringing (Am I to play these triplets the French or Italian way?), (c) personal taste (How furious is *furioso*?), (d) the notation's graphic trace (How well is the piece engraved? Are the symbols legible?), as well as many other factors. Naturally there will always be some discrepancy (ranging from inconsequential to game-changing) between the composer's received syntax and the performer's based on their entirely distinct lived experiences.

In addition, I have drawn an arrow from "syntax" to the γ complex in order to depict (very generally) the way these syntactic elements influence the artifact that is the score, though perhaps it would be more correct to point this directional influence at the "audition," "writing," and "reading" processes themselves.

In advance of this, though, it is crucial that we first consider our received notion of what, precisely, constitutes an "open work." Given that our stated goal is the development of a working typology, it is worth assessing those sources which posit new forms of notation; in practice, usually ones designed for the construction of new, sonically indeterminate works. Writers with insight into these new forms of composition often have views on their attendant notations which are worth examining in greater detail: specifically, the way that they pull apart "fixed" and "open" notations.

2.2 The open work in the literature

2.2.1 The open work for Eco

As far as I am aware, the use of the term "open" to refer to certain types of ("indeterminate," "aleatoric," "improvisatory") artwork dates to Umberto Eco's collection *The Open Work*, published in English in 1989 but comprising essays dating back a further 25 years or so. Here, Eco discusses the many ways a work of art—be it music, prose, sculpture, etc.—may be left "open" by its creator, ensuring that it can never meaningfully be represented by only a single vantage point. The open work, for Eco, is still "unfinished" at the time it is handed to an interpreter or a reader and requires active participation on the part of the recipient in order for it to reach completion. To be clear, this is not a music-philosophy text; Eco merely uses discussion of the new rush of open compositions as a launch-pad for his analysis of greater artistic trends. As such, the cross-section of musical works he uses as case studies is unfortunately rather narrow. Eco focuses on the musics he knows best—namely, mid-century avant-garde concert music—to the conspicuous exclusion of any Afrocentric open works which were (at time of writing) fully flourishing. Nevertheless, the book remains an important touchstone in the field and as such might aid in our goal of assessing the form and function of

13. Anthony Braxton, *Composition No. 76* (Tri-Centric Foundation, 2014).

performance-mediating notations. Right from the outset, in a chapter dubbed "The Poetics of the Open Work," Eco puts forward his model of musical openness by examining four recent musical works penned by some of the towering figures of mid-century composition—Karlheinz Stockhausen, Luciano Berio, Henri Pousseur, and Pierre Boulez. Each of these works he considers in some way genetically open—"incomplete" or "unfinished." Of these he observes:

> What is immediately striking in such cases is the macroscopic divergence between these forms of musical communication and the time-honored tradition of the classics. This difference can be formulated in elementary terms as follows: A classical composition [...] posits an assemblage of sound units which the composer arranged in a closed, well-defined manner before presenting it to the listener. He converted his idea into conventional symbols which more or less oblige the eventual performer to reproduce the format devised by the composer himself, whereas the new musical works referred to above[14] reject the definitive, concluded message and multiply the formal possibilities of the distribution of their elements. They appeal to the initiative of the individual performer, and hence they offer themselves not as finite works which prescribe specific repetition along given structural coordinates but as "open" works, which are brought to their conclusion by the performer at the same time as he experiences them on an aesthetic plane.[15]

Here, Eco provides a basic framework by which we might understand openness in musical works at large. In short, for Eco, an open work is one which requires "initiative," i.e. active collaboration on the part of the performer in order to bring the work "to [its] conclusion." Open works here function "like the components of a construction kit," with no one canonical assemblage of their parts. Indeed, there seems to be a startling and immediately apparent distinction between canonical works of classical music and these new open forms which demand active, creative decision-making on the part of the performer. Interestingly, Eco expressly rejects the notion that "openness" as a property might be applied to *any* scored work which requires the interpretation of a performer in order to truly come into being—arguing instead that open and closed works represent a true difference-in-kind. He claims:

> At this point one could object (with reference to the wider meaning of "openness" already introduced in this essay) that any work of art, even if it is not passed on to the

14. ...he specifically cites Stockhausen's *Klavierstück XI*, Berio's *Sequenza* for solo flute, Pousseur's *Scambi*, and Boulez' *Third Sonata for Piano*.

15. Umberto Eco and David Robey, *The Open Work*, ed. Anna Cancogni (Cambridge, Mass: Harvard University Press, April 1989), 2–3, ISBN: 978-0-674-63976-8.

> addressee in an unfinished state, demands a free, inventive response, if only because it cannot really be appreciated unless the performer somehow reinvents it in psychological collaboration with the author himself. Yet, this remark represents the theoretical perception of contemporary aesthetics, achieved only after painstaking consideration of the function of artistic performance; certainly an artist of a few centuries ago was far from being aware of these issues.[16]

It seems that for Eco the rigidity of the historically contingent rules and norms with which interpreters of "closed" works (Monteverdi, Brahms, Stravinsky, et al.) performed their pieces preclude any sense of openness seeping in through the various unspecified parameters (dynamics, say, or lengths of fermatas) which would be creatively filled-in by the aforementioned composer/performer "psychological collaboration." In traditional, "classical" works, "[w]hat in fact is made available [i.e. left open] is a range of rigidly preestablished and ordained interpretative solutions, and these never allow the reader to move outside the strict control of the author."[17] While Eco spends much of the chapter eloquently drawing parallels between open forms as they exist in the plastic arts, literature, drama, etc., I would like to bracket these in favor of examining his perceived dichotomy between (in his terms) "open" and "classical" works.

For convenience, I'll use "taste" as shorthand referring to the suite of musical conventions, unspoken rules, etc. which serve to fill in the gaps of a not-fully-determinate work (e.g. the "taste" which determines dynamics in a Bach performance). Certainly, in the same sense that music notation functions positively and prescriptively as a call for a player to act in a certain way, this musical taste is always already present for the performer as a constraining factor. Thus, Eco would argue, a Baroque continuo with figured bass cannot be said to be "open" in the same sense as *Klavierstück XI*[18], since there exists (or at least existed at the time of writing) no particular socio-aesthetic conditioning surrounding the performance of a Stockhausen work. The realization of a figured bass is, in a sense, overdetermined

16. Eco and Robey, *The Open Work*, 6.
17. Ibid.
18. Distinct from the mid-century open works I've discussed so far, Stockhausen's work merely presents the pianist with a number of "fixed" fragments of various lengths. The performer must decide where to begin the piece and in which order the fragments will be played.

by this conditioning. Where Telemann intended his harpsichord accompaniment (however improvisatory) to function within these bounds of good taste, and therefore held them fixed, so the argument goes, Stockhausen built the notion of performer agency and "incompleteness" into his work from the get-go.

This seems like a strange take. If the openness of a work is entirely contingent on a combination of the composer's intent and some nebulous sense of "rules-as-understood-at-time-of-writing," then, yes, perhaps despite the wide creative latitude Telemann's harpsichordist would have had in the performance of one of his concerti, these pieces could be considered "closed" in light of the overwhelming influence of unspoken poietic factors. However, despite much effort on the part of music historians to reconstruct an "authentic" Baroque performance practice, the boots-on-the-ground reality of the taste which governed players in Telemann's time is phenomenologically extinct to us. A twenty-first-century performer of Baroque music simply cannot be said to be confined to the same norms as was her eighteenth-century counterpart. The contemporary performer, then, must exercise her own creative agency in deciding precisely which voicings to use for the provided figured bass—agency tempered, certainly, by historical precedent; by the desires of her employer; by the actions of the other musicians on the bandstand but agency ultimately her own. Thus Baroque continuo is, to the modern performer, a fragment of an open work: one which blends seamlessly in with the more fixed elements of the same piece (rigid metric structures, diatonic scales, etc.). The norms which "closed off" the work so long ago no longer exist.

Further, I am skeptical of the notion that the deliberate measure of openness incorporated into the modern works Eco cites somehow precludes the influence of contemporary aesthetic norms on their performance. In fact, I think it would be more controversial today to somehow claim that canonical works like these could somehow be exempt from these same constraining pressures. Surely the timing of *Sequenza*'s fermatas or the pauses in Boulez' *Third Sonata for Piano*—both factors which Eco takes to be indicative of the pieces' openness—are as much governed by "preestablished and ordained interpretative solutions" as are classical cadenzas,

etc. Perhaps it's true that classical music aficionados are more stringent than contemporary music critics in their assessments of faithful or authentic performances, granting less leeway in the execution of "closed scores," but certainly we could find a "wrong way" to perform the *Sequenza* such that it would merit being corrected by an improved sense of "taste."

Finally, Eco's omission of any of the myriad contemporary Afro-diasporic open works is somewhat troubling. Of course, Eco does not purport to exhaust the world's various open music paradigms, but given jazz's impact on mid-century composition, intellectual discourse, and culture at large, we should expect some reference—even if only a dismissal from the new model of composition he identifies. Jazz is, after all, the preeminent genre for which works are "brought to their conclusion" by some performer who radically co-creates the final sonic product even as she "experiences them on an aesthetic plane." While we could feasibly imagine a sort of platonic notion of one of Bach's keyboard works, for instance, it is definitionally impossible to conceive of Charlie Parker's early 1949 performance of "Cardboard" without taking into account the way in which Parker himself completes the work in the very moment of its realization.

That is to say: the performance of a Bach piece is easy to perceive as an instance of a work which has a meaningful existence independent of any *particular* performance. It's conceivable that a player who had never heard Bach could faithfully render BWV 1001 such that it would please most listeners. "Cardboard," however, utterly relies on Parker's performance practice. As a performer/composer, the rhythmic and harmonic language which which he improvises on the tune is simply integral to a meaningful conception of what it is to perform the piece. In other words: the very substance of what constitutes a work proper in the jazz paradigm is inextricably bound up in the way they are "completed" post-composition.

Thus, the fairest conclusion, it seems, is that Eco would sort jazz composition and performance practice into the same category as those of the Baroque period (as I have done provisionally in the previous chapter). After all, despite the extent to which Parker's in-the-moment creative contribution is interwoven with the very notion of a "complete"

performance of one of his works, as a performer he was still ultimately beholden to those "deterministic" constraining factors. Parker's radical refiguration of these artistic norms aside, we can certainly conceive of creative avenues which would have been, in effect, closed off to him in performance: a certain conception of tonal order still held sway. Despite these constraints though, Eco would be hard-pressed to argue that jazz fails to provide its performers with the space to partake in "'acts of conscious freedom' [...] without being influenced by an external *necessity* which definitively [prescribes] the organization of the work in hand."[19]

A musician's experience of "freedom" or constraint in performance is never without some context described by the composer's intent, the performance scenario (venue, patron), the musician's familiarity with the material, etc. The harmonic and rhythmic context of a jazz performance represent only a single additional layer of constraint when compared with that of the *Sequenza* performer. In short, a jazz musician who is familiar enough with the harmonic/rhythmic/stylistic context of a work that these constraints fade into the background absolutely has the potential to experience this same sort of unmotivated freedom which, for Eco, characterizes the open works of the mid-century moderns. Per Berliner's *Thinking in Jazz*:

> As the multiple associations of their ideas wash over improvisers, they put into operation their well-practiced skills at negotiating the many possibilities. They select some for development and tightly manage their interrelationships. [...]
>
> Similarly a soloist's most salient experiences in the heat of performance involve poetic leaps of imagination to phrases that are unrelated, or only minimally related, to the storehouse, as when the identities of formerly mastered patterns melt away entirely within new recombinant shapes. [...]
>
> It is in dramatic movements from formerly mastered phrases to unrehearsed patterns, from commonly transacted physical maneuvers to those outside the body's normal reach or hold, and from familiar frames of reference within compositional forms to uncaclulated structural positions, that improvisers typically push the limits of their artistry.[20]

The more one considers the sheer relevance of jazz performance to Eco's argument, the

19. Emphasis his. Eco and Robey, *The Open Work*, 4.
20. Berliner, *Thinking in Jazz*, 216–7.

more glaring his omission becomes and the more intellectually problematic Eco's particular division seems. Eco mentions jazz (indeed, even "improvisation" at all) only once in a later chapter—and not in the context of the form of the open work.[21] *Opera Aperta*, the Italian-language collection that eventually became *The Open Work*, was published in 1962. My hunch is that the sense of newness surrounding the rush of innovative neo-notation-mediated works at this time pushed Eco consider these works a great leap forward in music technology and to fail to consider the extent to which the structure and phenomenal experience of openness in earlier, established forms parallels that of these newer works.

Regardless, Eco's dividing line seems to be motivated primarily by two main factors: (a) the desire on the part of the composer to abstain from some portion of creative decision-making (i.e. composerly intent) and (b) the constellation (or seeming lack thereof) of constraining factors on the "network of limitless interrelations" which avail themselves to a performer. Despite the clear "incompleteness" of Baroque or jazz works, Eco is unwilling to permit that their execution bears crucial similarities to that of the deliberately stripped-down, "unfinished" works of Berio, Pousseur, et al. Ultimately Eco's binaristic view of open v. closed musical works only serves to obfuscate these parallels, which inevitably end up more interesting than these works' discrepancies.

Before moving on to postulate a more inclusive notion of the open work—one more suited, again, to the variety of notation-mediated musical experiences in the twenty-first century—I would like to visit one more scholarly work, this time by a subject of one of Eco's case studies.

2.2.2 The open work for Boulez

Pierre Boulez, often considered a sort of intellectual foil to arch-open-composer John Cage, is perhaps best known for his brief commitment to integral serialism; usually exemplified in the literature by his near-totally algorithmic piano piece *Structures I* which extended the early twentieth-century practice of row-manipulation to the parameters of duration and dynamic

21. Eco and Robey, *The Open Work*, 109.

as well as of pitch. We might, in a sense, consider this style of composition more fixed, even, than the familiar "fixed works" of the Romantic period insofar as the actual sonic products end up predetermined to a large extent by their precompositional material rather than by some exercise of composerly will.

His exposure to decades of new compositions with novel notation schemes over his tenure as one of the world's preeminent conductors yielded a lecture titled "Notation, Transcription, Invention" which was initially delivered at the Collège de France circa 1991 and later published in his collection dubbed *Music Lessons*. Much broader in scope and perhaps less focused than Eco's chapter as a result, Boulez' lecture seeks generally to interrogate "what it is that graphic inscriptions[22] communicate and how that communication works."

So as to avoid burying the lede: for Boulez, there are no "open" or "closed" musical works—save perhaps for entirely deterministic works produced for mechanical reproduction. Instead, there are merely notations which bear more semantic content for some interpreter (thereby yielding more consistent—more fixed—results) and those which bear less (demanding more input from the interpreter—more open). A work on the whole is not open or closed, finished or unfinished, so much as its constituent symbols provide for more or less creative latitude on the part of the performer. Musical works are often complex; combining symbols at multiple levels of fixity at once.

Since notation mediates the openness or fixity of a musical work moment-to-moment, Boulez takes pains to describe several operant categories of notation that perform different sorts of mediation.[23] For Boulez, music notations largely fall into two categories according to their function: "Action notation" functions like a tablature; indeed all sorts of tablatures from guitar's six-line fret notation to fingering diagrams for woodwinds fall into this category. An action notation describes a mechanical process that the performer must undertake in order that some desired sound be produced: a finger must be placed on a particular fret or a specific combination of clarinet keys must be depressed. The performer need not necessarily bear in

22. ...which in this case we may take to mean any inscribed means of communicating musical moves...
23. ...albeit not always in the most consistent of terms.

mind the composer's sound-concept in order to realize the final product. "Result" notation (also called "outcome" notation in the lecture) attempts instead to *directly* represent the desired sonic outcome. The same clarinet multiphonic could be called for via result notation if it were instead represented by a number of coincident pitches on the staff, imprecise though they might be. For Boulez, a sound-concept might be represented using either of these paradigms; it is the responsibility of the composer to perform a sort of cost/benefit-analysis to determine which form of notation is best for a given scenario.

One important subset of this action notation Boulez dubs "launching" notation, "which is above all an invitation to the imagination, the starting point for improvisation." Here (in contrast with Eco's model) he places the both the improvisation-oriented notation of the Baroque as well as that of jazz. In the act of their interpretation, genre conventions necessarily constrain the performer's imagination but "[leave] a limited but definite space" for creative co-composition. When a player reads through these launching notations, "creativity operates on the remembered materials and gives them new qualities." Boulez notes that launching notations as typically deployed are often stripped-down, simplified versions of traditional notation—"[avoiding] a high degree of arbitrariness while retaining enough internal logic to support such *individual* arbitrariness."[24] A given sonic outcome, then, might result from any one of (or combination of) these disparate forms of notation. We might imagine a passage for guitar "triply" indicated with traditional notation, tablature, and a chord symbol (see Fig. 2.6):

24. Pierre Boulez and Jean-Jacques Nattiez, *Music Lessons: The Collège de France Lectures*, First Edition, ed. Jonathan Dunsby, Jonathan Goldman, and Arnold Whittall (Chicago: University of Chicago Press, November 2019), 530, ISBN: 978-0-226-67259-5.

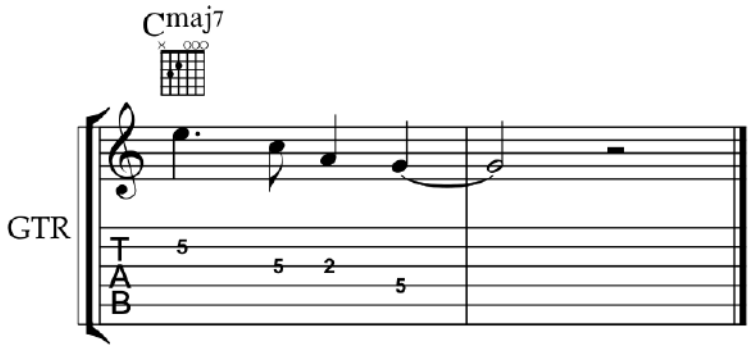


Figure 2.6: An excerpt for guitar demonstrating Boulez' three main categories of notation. From top to bottom: *launching*; *result*; *action*.

Per Boulez' formulation, the melody given here in traditional notation is an example of "outcome" notation: The pitches encoded here on the top staff represent discrete sonic events with a certain predominating frequency and a certain duration: the outcome a composer hopes to achieve. The tablature beneath serves as "action" notation: Numbers indicate positions on the fretboard for a particular string which will ostensibly produce the desired pitches. Finally the lead-sheet symbol above (along with accompanying fretboard diagram) are examples of "launching" notation: prescribing creative boundaries for improvisatory action rather than sounds themselves of the same level of specificity as the other two forms. Crucially, while any of these alone might result in a sonic outcome which would satisfy a composer, they each display a radically different level of fixity. That is to say: in this example, result notation most tightly restricts the sonic outcome, followed by action notation which, taken by itself, allows for a great deal more latitude given its lack of durational values and rests (hence its frequent accompaniment by traditional notation in transcription/pedagogical texts). Launching notation, by design, only very loosely constrains the field of potential for a performer in terms of the pitch content of the sonic result. An illustration summarizing Boulez' notation typology is given in Figure 2.7.

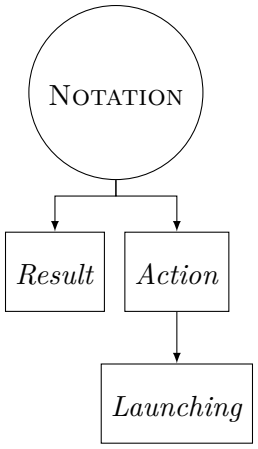


Figure 2.7: Boulezian typology of music notations.

Much of Boulez' lecture is concerned with factors which might lead a composer to opt for one of these forms of notation over the others. He writes:

> [T]o no small degree, the desire to compose comes from the contact we have with our musical heritage, our imagination naturally—necessarily—fits itself into regions defined by the lessons we have had. We think by way of them, thanks to them; and these ideas will conform to traditional kinds of notation. Yet new methods are vital when reflection intensifies our awareness of the differences between our heritage and ourselves. Using smooth time, in the realm of duration, where pulsation is no longer evident, or any point of reference to unity, and none of the multiple units of value such unity embodies, implies that we seek out either a spatial distribution that visually represents the temporal distribution we are imagining or an approximate correspondence of values for which an exact numerical correspondence is impossible.[25]

For Boulez, composers typically limit themselves to traditional notation because it is only from within this traditional framework that they received their training and the bulk of their musical experiences. In essence, their musical sound/process-concepts are predominantly conceived *in terms of* this notation—ergo, it represents the boundaries of their musical experience. A composer who develops a new S/PC, perhaps one which relies on a notion of spatial analogy or of some form of indeterminacy, is thus best served by a notation which traces the contours of this concept.

In this way, Boulez implicitly posits a sort of smooth continuum of notational fixity spanning from hyper-precise result notation intended for machine realization (e.g. a Conlon

25. Boulez and Nattiez, *Music Lessons*, 531.

Nancarrow player piano roll); down through the less-fixed notation for Baroque and jazz performance (featuring both a high degree of latitude *and* a high degree of specificity); all the way to wide-open neo-notations ("aleatoric music [...] 'floating' music without pulsation" or "non-tempered intervals, where certain local notational features must be devised") which may only specify one parameter, leaving the rest to interpretation.[26] Interestingly, he makes no explicit mention of the now-common edge case that is the asemantic graphic score—that is, a certain type of (what I've been calling) "image-first" score—which makes no attempt to encode musical parameters at all (even while potentially gesturing at traditional glyphs, à la Cornelius Cardew's mammoth and oft-cited *Treatise* 1963–7).[27] Neither, though, does he (directly) mention Feldmanian or Cagean graphic scores which explicitly provide keys for their interpretation. Crucially, he draws no particular distinction between these and other open notations strictly on grounds of the novelty of their encoding mechanism.

This wisely side-steps a problem we have not yet addressed—namely, the problem of cleanly separating what we typically think of as "graphic" scores from traditional or modified-traditional scores (themselves necessarily "graphic" insofar as they comprise written symbols as opposed to, say, strictly text). Rather, while we often categorize notations based on their appearance and the extent to which they deviate from tradition, Boulez opts to distinguish them by their *function* as prescribed by either received syntax or by a composer's instructions—that is, by the way they communicate. Action, result, or launching notations might take familiar or unfamiliar forms, but in the end it is their syntax and communicative semantic content which differentiate them from one another rather than superficial properties of their physical traces.

In the end (perhaps unsurprisingly) Boulez comes across as rather conservative when it comes to a composer's choice of notation; gently ribbing those who spring at the chance to devise radical new systems seemingly for their own sake.

> With new objects [...] whose codes are presently uncertain, even non-existent, tran-

26. Boulez and Nattiez, *Music Lessons*, 53f6.
27. These asemantic works will be discussed in greater depth later in the chapter.

> scription becomes difficult, imprecise [...] complex to the point of uselessness[...] The problem lies in the attention required by the signs defining the object that one wants to communicate – quantitative or qualitative. Familiar signs, newly invented signs, super-elaborate signs, deceptive signs – a large number of solutions are available to the *inventor* who might, in time, become a composer.[28]

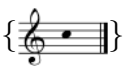
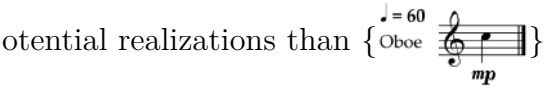
Ultimately, for Boulez, new notation ought not be conceived and adopted merely as a means to mediate or alter a performer's relationship to a musical text. Rather, innovation should always be motivated by the pursuit of greater fidelity to a composer's "object"—i.e. her sound/process-concept. I take it, though, that in many cases composers who design bespoke notations, sometimes only encoding rather simple process concepts ("play higher than x," "play something loud!") are taking this mediation/alteration as their brute materials—just as Boulez took pitches and durations as his—and are therefore worthy of serious consideration despite their "inefficiency." This conservatism, though, does not detract from the general salience of his argument. His analytic rubric (a) focusing on notation's function over its form and (b) permitting the smooth continuum of notation's multivariate fixity is essentially the only way forward if we take as our goal a more detailed understanding of modern notation practices. These represent a significant leap forward over Eco's binaristic take on the open work and thus is one we'll carry with us as we further assay the open music practices of the twentieth and twenty-first centuries.

2.2.3 Do we need an open work?

Confronted with Boulez' argument, the question arises: Is it actually important that we take a stab at more robustly defining the open musical work? After all, as I concluded in a prior section, all scores performed by humans are at least trivially "open" insofar as they all permit (demand) some degree of conscious or unconscious creative decision-making on the part of a performer before the work is able to exist—as intended—as sonic products. Each symbol, no matter how strict, merely affords a field of potential action to a player and will

28. Boulez and Nattiez, *Music Lessons*, 532.

always contain far more than one relevant gesture; ergo, the product is not strictly regulated pre-performance; ergo it is open. Ultimately, though, this leaves us unsatisfied. Ask a pianist who has played both *Structures I* and Brown's *December 1952* which piece (if either) is open and which (if either) is closed. Ten times of ten they'll respond that the latter is—or at least feels—wide open. I take it that a robust notion of open works must be able to account for this experiential discrepancy; that is, it must be able to point to the most salient features of the composer/score/performer relationship which bring about this phenomenological difference.

The simplest solution would be to claim that a score is open if its symbols denote sufficiently large (or "broad") fields of potential action. The breadth of this field is indeed one way we might think to class notational glyphs. After all, it is fairly clear (per Section 1 of this chapter) that {  } affords far more potential realizations than { 

} and thus has a broader FOP. However, it is inevitably difficult to identify, in concrete terms, magnitudes of size for these fields, given that even the "smallest," most closed-off FOP permits essentially infinite realization—albeit many with vanishingly small sonic differences. Undeniably, $|FOP\{C5_{bare}\}| >> |FOP\{C5_{oboe}\}|$, but by how much? By what proportion? It remains unclear. As such, it would be untenable to categorize open works strictly according to the size of their symbols' FOP—i.e. by the sheer number of creative interpretations possible.

Rather, to identify a categorical distinction characterized primarily by an *experiential* difference, it would only make sense to congruently appeal to the experience of the performer. Clearly there are certain musical parameters that we as performers are accustomed to having "held open" in performance, despite experiencing a work as closed to creative contribution. If I, a hypothetical conservatory clarinetist, perform Stravinsky's *Three Pieces for Clarinet Solo*, I experience it as a fixed work even given its inherent openness—i.e. the creative liberties afforded to an unaccompanied musician: timbre, intonation, microtiming, dynamics, etc. My experience with the piece's encoding scheme and my knowledge of the expectations which attend western concert music performance in general let me know that the larger-scale pitches, onsets, durations, and tempi are not up for negotiation and must be observed according to

the score which dictates them.

When, on the other hand, I perform Louis Andriessen's *Workers Union* (1975), I am suddenly presented with notation which no longer affords fixed pitches individually; or, more accurately, it affords a broad *range* of pitches for each notehead present. As Boulez observed, it is often via this stripping-away of notational specificity rather than the addition of novel symbols that composers formally denote space for performer contribution. In Figure 2.8, Andriessen opts to encode melodic contour on a single-line staff rather than the traditional fixed-pitch five-line staff. As approximate pitch height is meant to be indicated by the relative distance from the horizontal center-line, I might begin the gesture presented at rehearsal letter **H** with a high written G♯5, A5, or A♯5, say, depending on how closely I track the spatial relationship between notehead and centerline throughout the piece.

Figure 2.8: Mm. 54–56 of Louis Andriessen's *Workers Union* demonstrating single-line-staff open pitches.[29]

Permissible deviations in pitch have now exceeded the typical "quantum" unit standard notation was designed to express. Where deviations on the order of the cent are permissible (read: inevitable) from performance to performance under traditional Western classical performance conditions, Andriessen's neo-notation encodes looser constraints: repeat performances will now differ in pitch on the order of the *semitone* or greater. As a clarinetist in the ensemble, the "liberation" of one of these typically non-negotiable musical parameters communicates to me the work's openness; striking me as an entirely new category of work. Further, while it is possible that the only noteworthy pitch deviation during Stravinsky's *Three Pieces* might be my minor, unconscious shifts in intonation, at a certain level when I perform *Workers Union*

29. Louis Andriessen, *Workers Union* (Amsterdam: MiziekGroep Nederland, 1975).

I must make deliberate formal commitments on the order of instrument register and specific pitch. This shifting of the domain of performance discrepancy from unconscious to conscious cognitive processes similarly renders the work "open." This might explain why Berio's flute *Sequenza* struck Eco as being distinct enough to include as a prime example of an open work, despite its really rather conservative affordances.[30] Per Berio's instructions, onsets and durations are "free," within the (fairly strict) confines designated by the given spatial proportions. This liberty is enough, though, to demand willful creative contribution from the player and ultimately to produce variances which exceed the typical discrepancy between theoretical and observed expressive attack timings (often much less than the duration of a sixteenth note); thus it strikes the player as a new sort of freedom.[31]

It seems that the best way to go about arguing for a distinct category of "open" musical works is to appeal not to composer desires, nor the physical trace of the score, nor even to the sheer number of potential unique realizations, but instead to the phenomenal qualities of the performer's engagement with the work. If, by dint of the player's active decisionmaking, willful creativity, surprise, etc., she feels as though she's engaged with a new type of work distinct from the sometimes typewriterly experience of more traditional "fully-notated" music; then the work is an open one. In the end, though, there are enough edge-cases to render the initial question moot. The score for James Tenney's *Having Never Written a Note for Percussion* (1971) consists entirely of one single-line staff for any percussion instrument; featuring no tempo indication, no time or key signature, and only a single rolled whole note centered on the notecard-sized page (see Fig. 2.9).

30. Roughly translated, its instructions read: "The execution time and duration ratios are suggested: by the reference to a constant quantity of space which corresponds to a constant metronome beat; from the distribution of notes in relation to that constant amount of space: [empty staff showing duration of one measure at 70 M.M.]. [empty staff] is therefore equal to approximately 0.80". The [eighth-note] notes must be played free: their effective duration is suggested by the attack mode. The duration of the [multiple beamed eighth-notes] notes is intended to be extended until the next note. The value of [fermata] is ad libitum. Small notes should preferably be played as quickly as possible. The distribution ratios indicated for [fermata] and small notes are only valid as a suggestion." Berio, *Sequenza per Flauto Solo*

31. Fernando Benadon, "Gridless Beats," *Perspectives of New Music* 47, no. 1 (2009): 135–164, ISSN: 2325-7180, https://doi.org/10.1353/pnm.2009.0019.

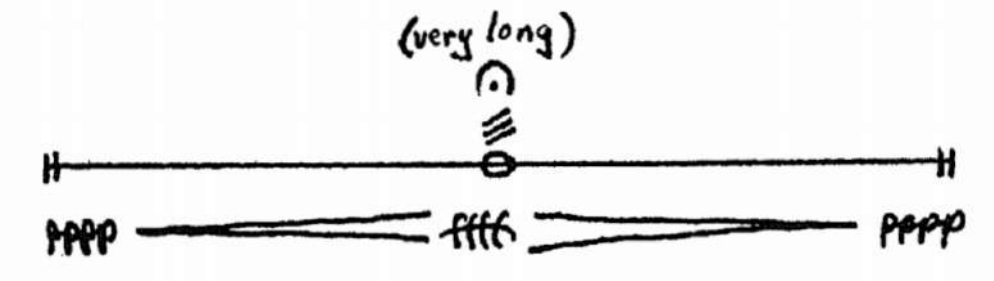


Figure 2.9: Full score of James Tenney's *Having Never Written a Note for Percussion.*[32]

Performance consists of a single swell from ***pppp*** to ***ffff*** and back—to be played over a "very long" period. The total performance duration is entirely up to the performer: a small sampling of YouTube performances range from one minute to thirty. Though it is most often performed on the largest gong one can muster, any percussion instrument may be selected. Given that the whole note is of uncertain duration, the three-line tremolo indication (typically representing either an unmeasured or a thirty-second-note roll for percussion instruments) is not specific with regard to frequency of attack. Clearly, this stripped-down notation conforms well to Eco's common-sense notion of open works. To the contrary, though, the piece is *experienced* as solidly fixed in place. Given that the dramatic arc of the work is so structured (i.e. with a dynamic apex right at the middle), once the performer has decided upon a particular length and a particular roll frequency, she will be able to execute the work as a singular, monadic gesture; one with as little deviation from performance to performance as would arise from a wholly-traditionally-notated version of the score. Ultimately, whether we ascribe the qualifier "open" to the work or not, the notation affords what it affords.

At least as pertains to deliberately-encoded structures of notation (be they of traditional, stripped-down, or novel forms) I maintain that the notion of the "open score" as such is a distinction without a difference; standing in for an arbitrary point on the fixity gradient. The concept may be a useful one insofar as it serves as lexical shorthand or encourages us to think more carefully about our roles as composer or performer, but it becomes increasingly obsolete

32. James Carl Tenney, *Having Never Written a Note for Percussion* (Noten Roehr, 1971).

in an era characterized by ever greater intermingling of compositional and improvisatory forces—both inside the classical canon and without.

2.3 Steps toward a typology

So far I have alluded to (but carefully side-stepped) a big issue at the heart of contemporary notation practices. At the end of the previous chapter, I compared Feldman's *Projection* series with Earle Brown's *December 1952* by contrasting them as representative of "sound-first" and "image-first" styles of composition, respectively. To be clear, these labels referred not to any positive attributes of the notations themselves, but to particular modes of construction favored by the composer. Where glyphs in a "sound-first" arrangement would be chosen for their ability to result in a specific desired sonic outcome, "image-first" compositions would be constructed based on a desired visual aesthetic; allowing the sounds to arise as they may.

It is important that this dichotomy in notation's poiesis not be confused with one which purports to say something about notation's *content*. Even using the most bog-standard traditional notation, for instance (which I take it is typically used because of the particular sounds it elicits) it is quite possible to construct scores from an "image-first" perspective—centering the visual results. One famous fifteenth-century example is given in Fig. 2.10; albeit one whose graphicality was probably never intended to impact performance per se.

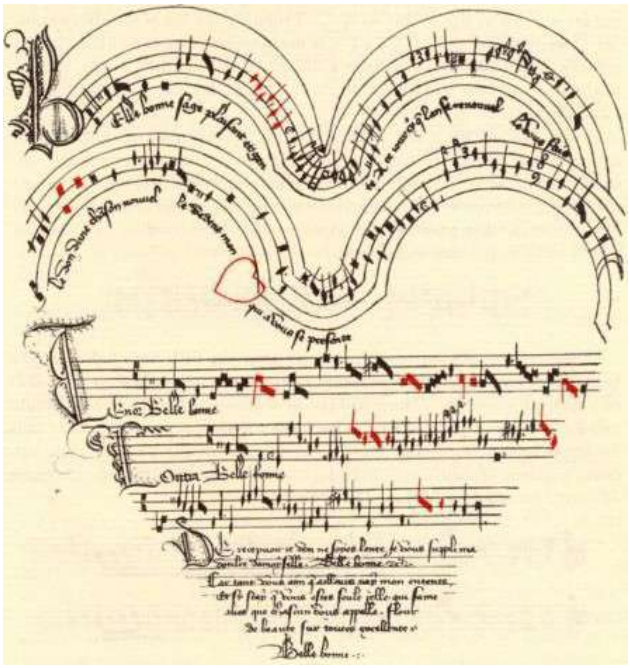


Figure 2.10: An early example of "image-first" notation: Fifteenth-century chanson *Belle, Bonne, Sage* by Baude Cordier, rendered using unconventional notation in the shape of a heart.[33]

On the other hand, Iannis Xenakis' electroacoustic *Mycenae Alpha* (1978) (excerpted in Figure 2.11) is an example of "image-first" composition in which final sonic results are entirely contingent on the graphicality of its "score". Xenakis here used bespoke hardware/software to translate drawing directly into sonic contour with no performer interpretation required. What we identify as its score is really more of a complex set of computer inputs which incidentally serve as a tightly-coupled visualization.

33. Found in the Codex Chantilly courtesy of Various, *Codex de la Bibliothèque du Château de Chantilly, MS 564*, Chantilly, France, accessed July 1, 2023, https://imslp.org/wiki/Special:ReverseLookup/267994.

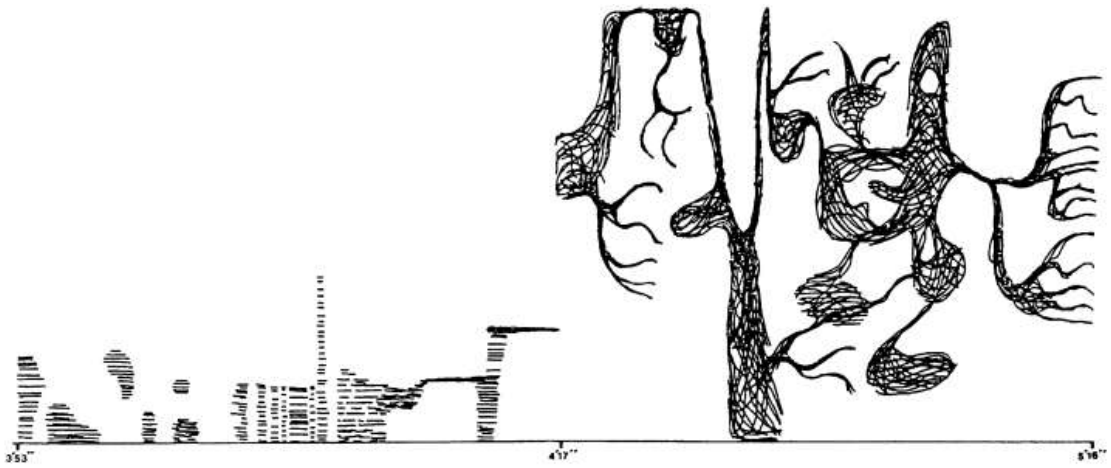


Figure 2.11: Page 2, system 1 of Xenakis' *Mycenae Alpha* (1978). Designed to be rendered precisely into sound by UPIC—bespoke visual-to-audio translation hardware/software.[34]

Shifting our focus to notation's content, however, requires an entirely new formal distinction. As I hope my argument in Section 1 has demonstrated, every piece of music highlighted so far may be functionally reduced to a single type of *composer* → *performer* communication: a sound/process-concept is encoded for eventual transmission and execution. There exists, though, a second type of musical inscription which upends this traditional relationship by rejecting the notion that a score need necessarily encode anything at all. Neither Eco nor Boulez directly address the existence of this second type despite its consistent presence in and amongst neo-notational works since the 1940s at latest. This is not to say that their existence has gone unheeded: Many other writers have engaged with these "asemantic" works in one way or another, most often in the larger context of 1960s sonic indeterminacy.[35] Overwhelmingly, these authors fail to substantively discuss the bare function of notation and the semantic/asemantic distinction among these scores; grouping these types together under categories like "improvisatory works," "indeterminate works," "aleatoric works," etc.

34. Iannis Xenakis, "Mycenae Alpha 1978," *Perspectives of New Music* 25, nos. 1/2 (1987): 12–15, ISSN: 0031-6016.

35. For instance, Chapters 8 and 9, "Improvisation" and "Indeterminacy," respectively in David Cope, *New Directions in Music*, 4th (Dubuque, Iowa: Wm. C. Brown Publishers, 1984), ISBN: 0-697-03607-3; Chapter 2 "Indeterminacy" in Taruskin, *Music in the Late Twentieth Century*; Chapters 2, 7, and 9 in Griffiths, *Modern Music and After*; etc.

Descriptors like these purport to say something about the composer's attitude toward openness, the relationship between composer and performer, and/or their desire for sonic indeterminacy—topics which of course merit discussion on their own. However, distinctions like these universally fall short of probing the actual mechanics of the works' fundamental building blocks: their inscriptions and their signs.

Thus far my survey of relevant literature has focused on well-known and widely-published scholarship. However, by far the most thoughtful and comprehensive treatment of the taxonomy and function of new notations comes in the form of György Ligeti's little-known essay „Neue Notation: Kommunikationsmittel oder Selbstzweck?" ("New Notation—Means of Communication or an End in Itself?"), original delivered at Darmstadt for „Notation Neuer Musik," a panel on new music notation. It was subsequently published in a special 1965 issue of the Darmstadt journal of new music.[36] Given that no extant English-language scholarship discusses this fascinating article, I would like to dedicate the following section to thoroughly unpacking Ligeti's insights; extending to both this important functional dichotomy and to aspects of notation already addressed in some detail in this chapter.

2.3.1 "New Notation—Means of Communication or an End in Itself?"

Vis-à-vis the article's title, the main thrust of Ligeti's argument is that depending on the precise way it is deployed, a novel system of musical notation may serve either as a means of communicating desired sound-concepts from a composer to a performer, or as a standalone performance-stimulating work of art, or both. Composers make decisions about how best to represent the ultimate sonic trace of the work depending on their artistic aims. However, Ligeti, unlike many other scholars, takes great pains to differentiate systems of notation

36. I'd like to extend an extra special "thank you" to Dr. Amy Bauer for providing a provisional translation of this paper. I'm told that an official translation is forthcoming, but for the time being I'll cite page numbers as they appear in the original German-language edition: György Ligeti, "Neue Notation—Kommuikationsmittel oder Selbstweck?", in *Notation Neuer Musik (Darmstädter Beiträge zur Neuen Musik 9)*, ed. Ernst Thomas (Mainz: Schott, 1965), 175–84

proper from what he dubs "musical graphics". Not to be confused with the more common usage of the term "graphic notation," which we often take to mean anything distinct from traditional staff-dot-stem-beam notation, Ligeti's use of the term here parallels what I have so far called "asemantic" notation—i.e. deliberately un-coded.

These graphics, he claims, bear the same relationship to a composition's sonic products as a drawing of a house does to the actual, three-dimensional house it represents. The drawing does not "mean" the house—it merely serves as a depiction; allowing one to recognize the really-existing structure in its two-dimensional contours, but not to construct the house by following detailed instructions. This depiction (of the sound or of the house) does not rise to the level of a sign in that it does not stand in a logically consistent network alongside other graphic depictions. We might once again take Cardew's *Treatise* as an example (minimally excerpted in Figure 2.12):

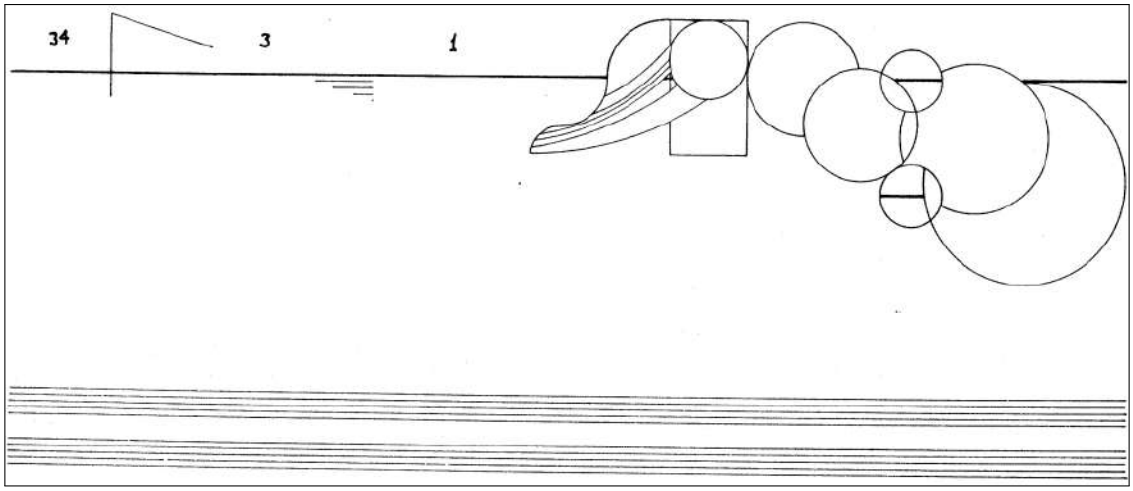


Figure 2.12: First page of Cornelius Cardew's asemantic magnum opus, *Treatise* (1967).[37]

Famously, despite an enigmatic gesturing toward traditional notation in the form of the clefless grand staff at the bottom of the page, the "symbols" used in the piece's construction (numbers, line segments, overlapping circles, etc.) bear no composer-mapped semantic content. Construction of meaning is left entirely as an exercise to the interpreter. Insofar as one

37. Cornelius Cardew, *Treatise* (London: Hinrichsen Edition, Ltd., 1967).

particular inscription can not be said to stand in any particular relationship to any other (save spatially), Ligeti takes these sorts of scores as comprising not notation, but something wholly separate.

For Ligeti, notation proper[38] necessarily forms an internally coherent system unto itself whose inner relationships bear some resemblance to the system of relationships present in the final sonic object—a system wherein notational glyphs (serving as signs) are laden with semantic content and which "[correspond] to a system of auditory processes" rather than standing in for sound directly.[39] He emphasizes that a means of scoring may only be dubbed "notation" so long as some means of inter-translatability exists between it and another coherent system of signs. Just as we could freely translate between (to use his example) FORTRAN and programmers' punch cards, so may we translate between traditional notation and, say, the "piano roll" notation used in digital audio workstations. Attempting to translate an asemantic graphic score in the same way would inevitably result in failure, Ligeti claims; thus it can't be considered notation at all but a wholly distinct type of composition. Over the course of the following section, Ligeti goes on to establish a tentative typology; one which seeks to encompass every form of what we might generally call "music inscriptions," focusing primarily on breaking down the many varieties of notation proper and using several contemporary pieces as apropos case-studies. For posterity and toward the defense of my own views, I will describe this typology here.

At the top hierarchical level sit the aforementioned "notation" and "graphics," cleanly separated by their contents: coherent relations with other signs on one side and pictorial marks on the other. Notation is divided into two primary categories: what he calls "result notation" (*Resultatnotation*) and "realization notation" (*Realisationsnotation*).[40] Result notation is by far the more deterministic of the two. So dubbed because it is ultimately the sonic *result* which is depicted on the page, result notation is used when uncertainty

38. To avoid confusion, I'll use "notation proper" to refer to Ligeti's understanding of the term; distinguishing it from common usage.

39. Ligeti, "Neue Notation," 171.

40. Notably similar to but distinct from Boulez' own categories.

between the scored "map" and the final sonic "territory" ought to be kept to a minimum. Most traditional notation, for instance, falls into this category. As it is typically deployed, a transcription can result in a near one-to-one mapping between image and sound. Result notation is also used in scored electronic music where frequencies, durations, linear/nonlinear movement, etc. have been mapped with exacting precision graphically. Here, Ligeti cites an excerpt from Friedrich Cerha's "Mouvement II" from *Mouvements I-III* which precisely represents moment-to-moment changes in pitch using glissando curves—accurately visually mapping the frequency content present for each instrument.

Realization notation serves instead as guidelines for actions which, if successfully performed will "realize" the desired sonic output.[41] Realization notations "may be totally clear, partly clear, or unclear," depending on the practical needs of the composer and the desired level of fidelity between the score and product. As realization notations become increasingly complex and precise, Ligeti claims, they begin to approach result notation in the tightness of their coupling to resultant sound.[42]

This realization notation is itself further divided into two categories—"action notation" (*Aktionsnotation*) and "recipe-" or "formula notation" (*Rezeptnotation*). Recipe notation is perhaps easier to grasp, occurring when a composer lays out perfectly clear step-by-step instructions describing what the performer must do to achieve a desired sound. This notation is often formulated as textual instructions (e.g. "softly strike a twelve-inch diameter tom-tom at the two-o'clock position one inch from the rim three times quickly") but also includes tablature notations which (as mentioned earlier in the chapter) describe the precise positioning of the hands and fingers necessary to sound as the composer intends. Recipe notation, unlike result notation, bears no direct parallels to the resultant sound. Instead, it is deployed in scenarios where (a) multiple paths exist which would result in a desired sound (and the composer seeks to isolate a single path for the performer) or (b) where notating the performer's step-by-step movement is ultimately more economical than encoding the resulting

41. Somewhat confusingly, Boulez would later refer to this as "action notation."
42. Ligeti, "Neue Notation," 178.

sound; notating the twist of a knob, for example, rather than the complex sonic output of a synthesizer.

Action notation, on the other hand, is on balance the least deterministic of the group. Like formula notation, it too exists to demonstrate a space of action to a performer which will result in a given sound or range of sounds when physically emulated. However, rather than providing a clear step-by-step recipe, it illustrates a visual analogy that the performer must interpret. Ligeti here cites the non-deterministic notation for the organ (which many others would incorrectly class as "graphic") found in Mauricio Kagel's 1972 *Improvisation ajoutée* (Fig. 2.13).

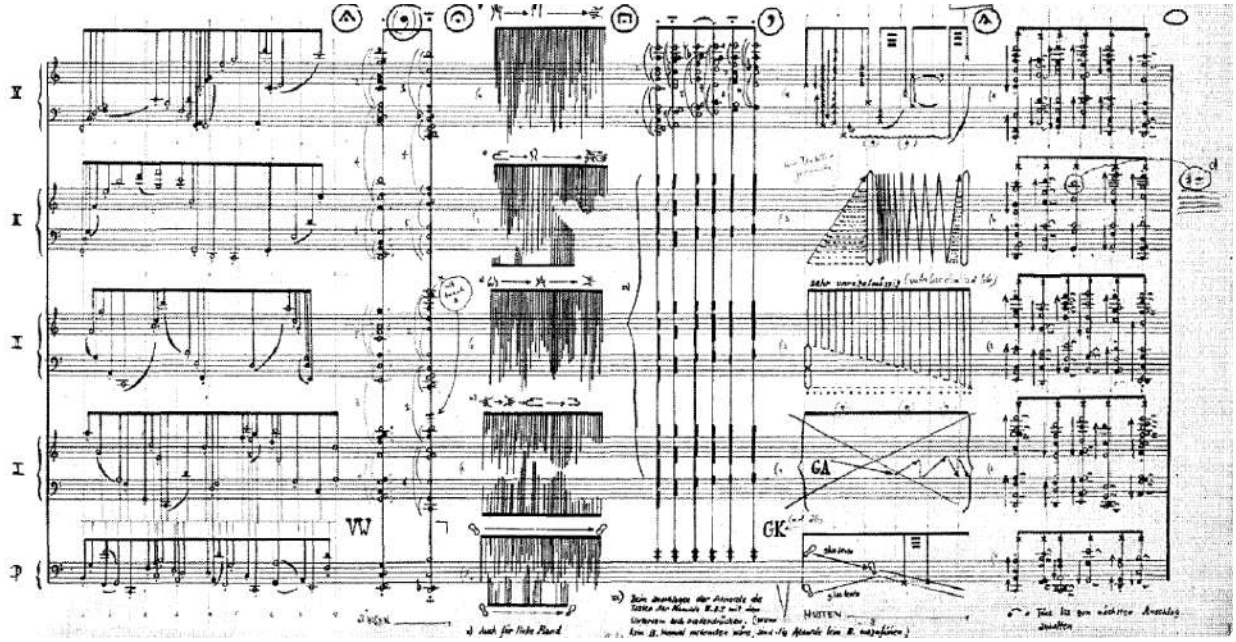


Figure 2.13: Excerpt of Mauricio Kagel's *Improvisation ajoutée* (1972) courtesy of Ligeti's original paper.[43]

Here we find glyphs seemingly based on traditional stems and beams, but impossibly tightly-packed into such a small space that a performer could not be reasonably expected to execute their attacks with a traditional level of "faithfulness" to the sign. Thus the performer must directly analogize their own physical gestures with the visual representation shown on

43. Ligeti, "Neue Notation," 181.

the staff—the result being necessarily less precise than the sonic output of a result notation. In Figure 2.14 I've provided a tree diagram summarizing the above description of Ligeti's hierarchy of notation types (contrast with Figure 2.7).

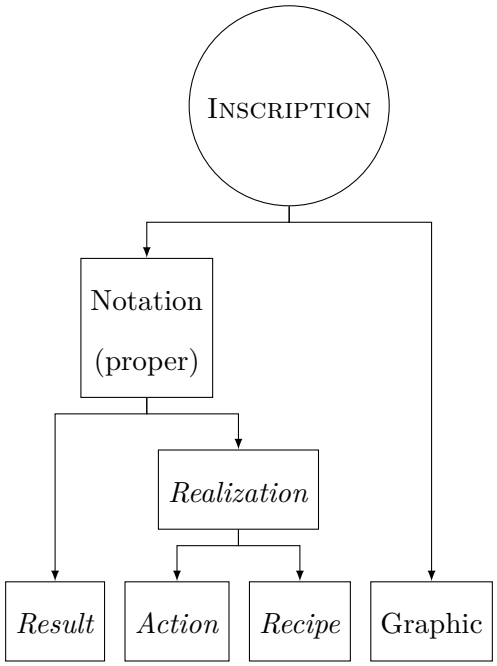


Figure 2.14: Ligetian typology of music notations.

Crucially, his rendering includes space for signs and systems which do not conveniently fall into one of the above categories; without these, any attempt to theorize notation would be woefully incomplete. Ligeti describes "intermediate forms" which demonstrate attributes of both symbolic notation and musical graphics, of which Brown's *December 1952* is his prime example.[44] Ligeti interprets Brown's work as both a graphical work unto itself as well as a formally delimiting agent; setting distinct (though imprecise) boundaries for performer interpretation via its visual arrangement. Ligeti claims:

> If [*December 1952*] is realized musically, there are numerous possibilities—and yet the interpretation is not totally free, because the visual configuration sets quite definite limits. In this regard, this musical graphic also possesses some (rudimentary) elements

44. It seems here that Ligeti, like Griffiths, was under the mistaken impression that *December 1952* lacked any preambulatory text or instructions. His argument is based on this assumption and thus treats the work like a particularly well-structured "graphic" rather than a notation as such. We'll bracket this oversight for now, as it doesn't particularly impact the thrust of his argument.

of a sign system.[45]

Ultimately, these hybrid forms not only serve as intriguing case-studies by which we might contemplate the nature of composer/performer agency, but also lend further credence to Ligeti's typology insofar as they demand separate analysis of the function of their constituent symbolic/graphic components. "[T]he fact that the sign component can be separated from the graphic aspect within mixed forms," he claims, "is itself a demonstration that we are dealing with two fundamentally different categories."[46]

In the end, Ligeti argues that the composer's decision to deploy either a system of (neo-) notation or a pseudosystem of musical graphics rests on a question of desired "adequacy, clarity, and economy" in musical representation. His thesis here relies on a vivid analogy which takes the purely graphic score to be the *map* of a particular (sonic) territory and the notated score to be the walking of a *single path* through that territory. The musical graphic is both richer and more "wasteful" in that, like the map, it contains innumerable details pertaining to countless "hikes" that cannot be experienced in a single journey. In the act of performative interpretation, one necessarily discards every unrealized detail in favor of the chosen path. The "single walk," on the other hand, has its own inner richness in that it is able to reveal features invisible on the map—foregoing potential variety of experience for finer-grained detail and "paripeteias" otherwise inaccessible to such a zoomed-out view. The decision to enlist either the map or the path rests on the extent to which a composer seeks reproducibility and fine-grainedness or the richness of unlimited, irreproducible detail.[47]

Because, Ligeti claims, scored instrumental and vocal music always retains some "margin of vagueness" when contrasted with fixed electronic music, and because this vagueness is always already intimately tied up with the notational markings used to represent a flexible, imprecise music, systems of notation will tend to reflect this flexibility and imprecision. Thus, as contemporary composition varies wildly in its degree of determinism from piece to piece

45. Ligeti, "Neue Notation," 177.
46. Ibid.
47. Ibid., 178.

(and even within pieces!), pure one-size-fits-all systems of notation tend to be eschewed in favor of meta-systems which hybridize characteristics from pure graphics, result notation, action notation, and recipe notation depending on the particulars of the composition in question. The notation used to encode Kagel's *Improvisation ajoutée*, per Ligeti's example, succeeds not because it attempts to be unified and all-encompassing, but precisely because of the extent to which it hybridizes notations spanning Ligeti's typology: result notation in the form of determinate pitches, action notation for the organists hands and feet, and formula notation for entabulating the organ's stops.[48]

2.3.2 Why are Ligeti's typology and analysis valuable to us today?

Ligeti's appraisal of these distinct forms of notation and graphics, perhaps owing to his practical, composerly experience with many of these forms, is strikingly refined in contrast to other historical and contemporary takes on the matter. As such, I take it that further elucidation of this typology might be of some use in the study of notation and of "open" composition today. Ligeti is one of only a few scholars to draw a firm distinction between methods of music inscription on grounds of their semantic content or lack thereof—that is, on whether they denote concrete musical materials or merely connote potential spaces of action. Where many authors ambiguate these two antipodean categories under the label "graphic notation," "indeterminate notation," etc., for Ligeti, the fundamental property of an inscription is not its novelty, but its contents. Under Ligeti's formulation, the fixity of a notational glyph or set of glyphs does not necessarily correlate one-to-one with the strength of its semantic content. A functional, logically coherent sign system may have highly-fixed sounds or gestures as its points of reference, as in the precisely-engraved result notation of a piece of electronic music. On the other hand, a similarly coherent, denotative notation may point to highly *indeterminate* sounds or gestures—for instance, the dense, headless grace-note figures from *Improvisation ajoutée* or Feldman's pitch-range notation. These figures are

48. Ligeti, "Neue Notation," 180.

notational rather than graphic in the sense that while the performer's creative act of reading will vary significantly from performance to performance, the composer had a key role in determining the bounds of that semantic content (and therefore in predictably influencing the sonic products resulting from the figures' realization). As such, Ligeti separates notation's relative fixity or openness from its ability to meaningfully communicate. One might imagine a less nuanced view, whereby a glyph's communicative potential is strictly proportional to the quantity of its fixed content. A mode of inscription totally lacking sonic specificity would thus be unable to effectively communicate anything at all. Given, though, that many such sonically indeterminate works (including wholly asemantic works) enjoy repeat performances and some form of persistent identity, we should prefer to say that they retain communicative potential, despite their irreducibility to one particular sound world. We might represent these opposing univariate and bivariate views using "denotative" to indicate the presence of composer-provided semantic content and "connotative" to indicate its absence (Fig. 2.15).

Traditional univariate typology	
fixed and denotative	open and connotative

Ligetian bivariate typology	
fixed denotative	fixed connotative[49]
open denotative	open connotative

Figure 2.15: Univariate vs. bivariate notation typologies.

While under the old view, notation's content is directly proportional to its fixity, only concretely denoting insofar as its sonic products are predictable, under Ligeti's new bivariate view, notation may strongly denote regardless of the indeterminacy of its products. To elaborate on this distinction: Here, "fixed denotative" notation describes that which has been

49. "Fixed connotative" notation is a category merely implied by the existence of its antitheses. This is as-yet untheorized as it would require a notation which is somehow "defined" by its interpreter but which is nonetheless semantically stable across performance scenarios. The lack of a well-defined "fixed connotative" notation forces me to refer to fixity and content as only "quasi-independent" rather than truly independent properties.

rendered systematic in advance by the composer or by received practice. The final sonic trace of the work is more or less predictable/replicable because the notation hews closely to the final sonic product. Note that this is to say nothing of how closely it resembles traditional notation in its printed form; traditional notation does indeed fit into this category—but so does, say, the widely-adopted "cipher" tablature commonly used to notate Indonesian gamelan compositions (Fig. 2.16).

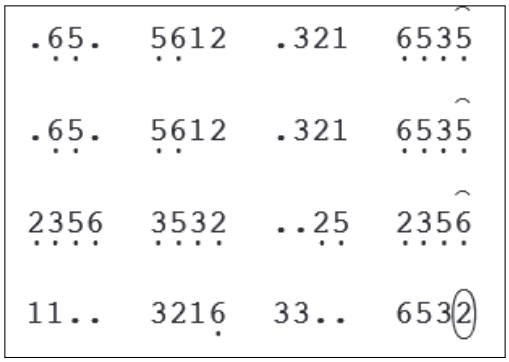


Figure 2.16: *Nut angka* contemporary style of gamelan notation demonstrating an excerpt of *Gending Titipati sléndro pathet nem.*[50]

The "open connotative" type, on the other hand, describes what Ligeti calls musical graphics—asemantic drawings which have no ahead-of-time systematicity. These figures only have meaning insofar as it is given by the interpreter, either pre-performance or in-the-moment (hence connotative). The quasi-symbols depicted on the page merely "suggest" musical moves; the final sonic products are entirely downstream of the performer's decision to (or refusal to) map glyphs to gestures themselves.

Finally, the "open denotative" category refers to the structures of notation that have so far been the primary topic of this study—specifically those in which symbols explicitly encode desired fields of potential action, but deliberately leave space for willful creative interpretation on the part of the performer. In other words, they bear semantic content (hence denotative) but maintain an indeterminate sonic trace. Per Section 1, the particular quality and quantity

50. Noriko Ishida, "The textures of Central Javanese gamelan music: Pre-notation and its discontents", *Bijdragen tot de taal-, land- en volkenkunde / Journal of the Humanities and Social Sciences of Southeast Asia* 164, no. 4 (January 2008): 475–499, ISSN: 0006-2294, 2213-4379, https://doi.org/10.1163/22134379-90003652.

of semantic "data" they bear is merely a function of the specificity with which it shapes the field of potential action afforded to a performer. Where Figure 2.14 demonstrated Ligeti's typology as expressly relayed in his article, Figure 2.17 refines this typology by making explicit the implied categories of semantic-fixed and semantic-open notations (again, distinct from asemantic, connotative notations). Note that, per earlier discussion, these categories do not represent a hard binary but rather two poles delineating a smooth gradient.

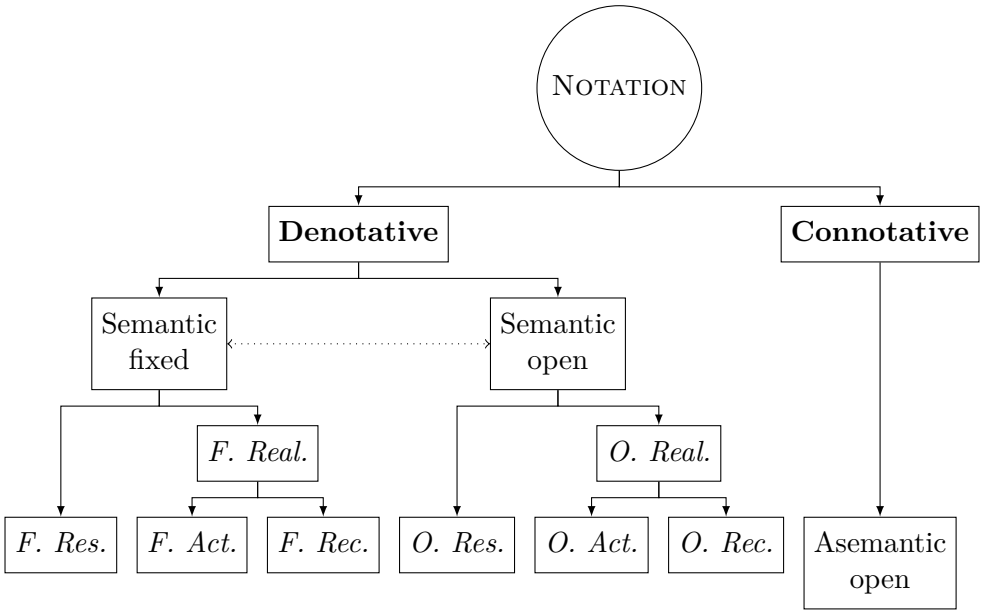


Figure 2.17: Refined Ligetian typology of music notations. Dotted arrow indicates presence of "fixity gradient" between the semantically fixed and open genera.

Among Ligeti's many observations, the relatively intuitive division of musical inscription into two fundamental categories—the semantic/denotative and the asemantic/connotative—represents a significant point of refinement for typologies of notation in general. I take it that this (in conjunction with his subcategories of notation proper) permits a more nuanced understanding of mid-century sonically-indeterminate notations and their descendants than is typical of the field. Let us take, for example, two works from the same time period which make extensive use of neo-notation: John Cage's *Concert for Piano and Orchestra* (1957–8)

(see Fig. 2.18) and No. 1 from Sylvano Bussotti's *Five Piano Pieces for David Tudor* (see Fig. 2.19).

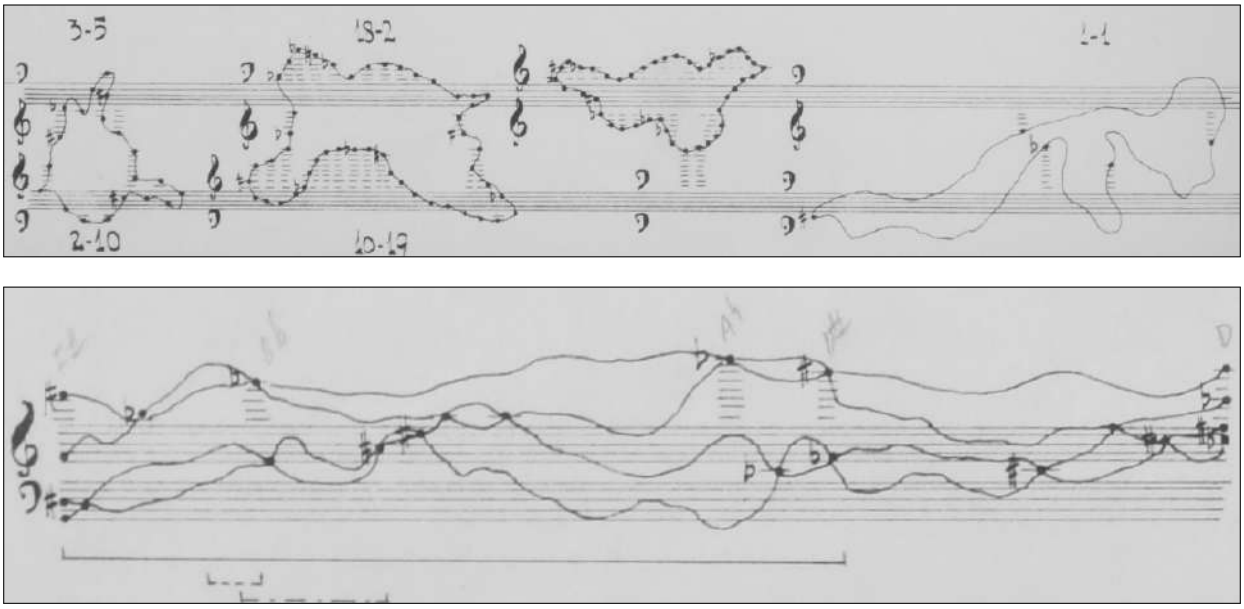


Figure 2.18: Modules "L" and "M" from Cage's *Concert for Piano and Orchestra* (1957–8).[51]

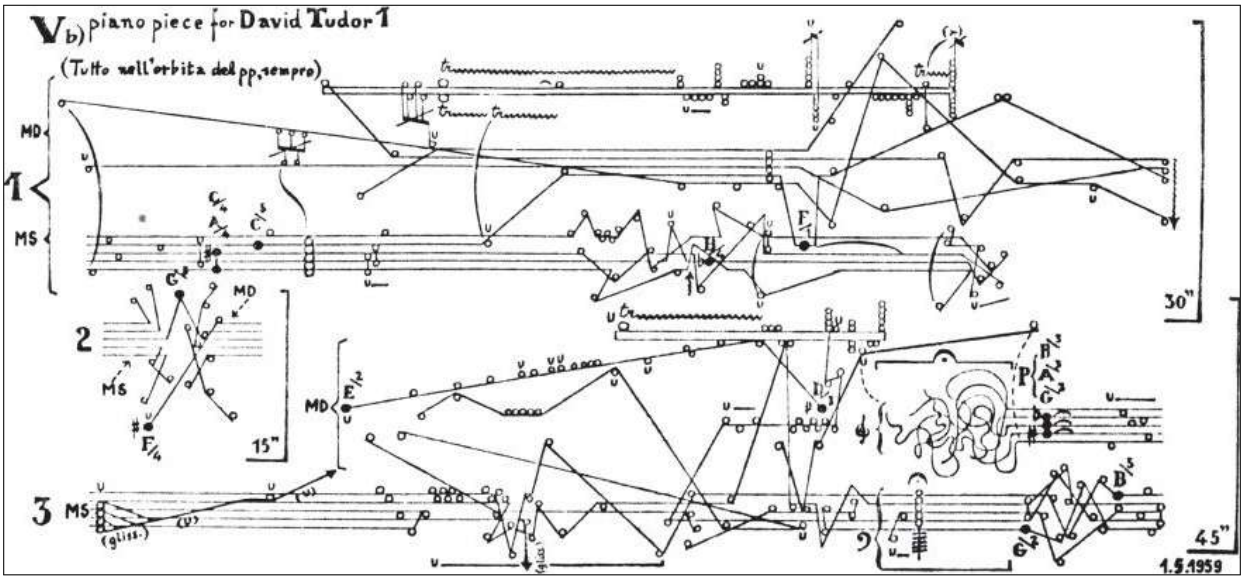


Figure 2.19: Full score of No. 1 from Sylvano Bussotti's *Five Piano Pieces for David Tudor* (1959).[52]

51. John Cage, *Concert for Piano and Orchestra: Solo for Piano* (New York: Edition Peters, 1960).

At first blush, there are many commonalities between these two excerpts. Both are pieces for unaccompanied piano which ground the performer in their sense of musical literacy by using familiar glyphs: staves, clefs, points which might represent attacks, linear or curved connectors. Both are clearly sonically indeterminate; requiring a significant degree of creative interpretation for their realization. The critical distinction between the two is that while Cage's piano solo came packaged with detailed instructions defining the boundaries of successful interpretation (given in Figure 2.20 for context), Bussotti's instructions for his piece for Tudor begin and end with the Italian inscription at the top of the page: "All in the orbit of ***pp***, always."

> [...] THE WHOLE IS TO BE TAKEN AS A BODY OF MATERIAL PRESENTABLE AT ANY POINT BETWEEN MINIMUM (NOTHING PLAYED) AND MAXIMUM (EVERYTHING PLAYED), BOTH HORIZONTALLY AND VERTICALLY [...]
>
> B: [...] THE SINGLE STAFF IS PROVIDED WITH 2 CLEF SIGNS. WHERE THESE DIFFER, AMBIGUITY OBTAINS IN THE PROPORTION INDICATED BY THE 2 NUMBERS ABOVE THE AGGREGATE, THE FIRST OF THESE APPLYING TO THE CLEF SIGN ABOVE THE STAFF. [...]
>
> L: PLAY FROM LEFT TO RIGHT WITH HANDS INDICATED. CLEF AMBIGUITY AS IN B. PERIMETERS WERE COMPOSING MEANS AND DO NOT HERE AFFECT TIME, AS THEY DO IN A.
>
> M: BEGIN AT LEFT, END AT RIGHT, CHANGING DIRECTION AT INTERSECTIONS IF DESIRED. MAY BE EXPRESSED AS ONE VOICE, A 'COUNTERPOINT,' OR AS 3 OR 4 VOICES. PEDALS ONLY IN AREAS INDICATED, NOT OBLIGATORY.[53]

Figure 2.20: Excerpt from Cage's instructions page for *Concert for Piano and Orchestra: Solo for Piano* (1960)

Cage's work inarguably compels a performer to interpret its symbols creatively. However, it does so by restricting (with lesser or greater degrees of rigor) the performer's field of potential using the symbols' semantic content which Cage himself encoded. To use Ligeti's terminology: the floating noteheads are examples of result notation in that they ought to result in the

52. Sylvano Bussotti, *Five Piano Pieces for David Tudor: 1959: Extraits de Pièces de Chair II (reproduction de manuscript de l'auteur)* (London: Universal Edition, 1959).

53. Cage, *Concert for Piano and Orchestra: Solo for Piano*, pg. B.

sounding of particular pitches. The "aggregates" of which they are members, though, are forms of action notation in that they provide a visual/spatial analogy for onset/duration to which the performer must hew. The text block preceding the piece is a sort of recipe notation insofar as it expressly denotes conditions for successful interpretation. Bussotti's work, on the other hand, predominantly comprises Ligetian "musical graphics" in that (beyond the initial inscription) the piece relies *entirely* on performer interpretation. Its familiar appearance and sprinkling of recognizable glyphs belie the fact that Bussotti intended the work in its entirety to serve as "launching" notation (to use Boulez' term); essentially in contravention of all received notions of musical literacy. Bracketing the *pianissimo* indication, any constraint on the potential action of the performer is up to the performer herself.

Many authors expressly or implicitly make the case that Cage and Bussotti's works from this period represent two adjacent ideological camps with regard to performer liberation—both employing a similar compositional language with Bussotti merely taking the marginally more "radical" tack in his permissiveness. What Ligeti illuminates, however, is that owing to their semantic structures, these two inscriptions represent two entirely distinct classes of "writing," with appropriately distinct structures of agency. Both are "graphic" in the colloquial sense of the term in that they depart from standard music encoding methods, but the approaches are miles apart when it comes to their actual function. Not coincidentally, Stockhausen selected works from the two series represented here when he conducted his 1959 Darmstadt lecture series entitled "*Musik und Grafik*" (diligently analyzed by David Gutkin in *Perspectives of New Music* (2012)). Though I lack the space to fully detail Stockhausen's (or Gutkin's) observations on what were then brand-new structures of notation, it's clear that both he and Gutkin take Bussotti's piano pieces to comprise a sort of implicit action notation; though one which "only effects actions in a very indeterminate matter."[54] While they note that Bussotti's inscriptions represent a basically new compositional method, they fail to articulate that an entirely new relationship is set up between composer (here "inscriber") and performer—one

54. Gutkin, "Drastic or Plastic?," 276.

in which essentially all *restrictive* capactity belongs to the interpreter while the inscriber serves only to "provoke" or "incite" action by connotation.[55]

To illustrate, I've included another interaction model (Fig. 2.21) to reflect the function of musical graphics (to contrast with that of notation proper). Noteworthy differences include: (1) The initial sound-concept becomes superfluous, the score is now merely an instance of *ekphrasis*—a drawing "about sound" but one ultimately informed by a graphic- (rather than a sound-) concept. (2) The score merely *connotes* a field of potential to the performer who (3) encounters the notation via *gazing* (per Gutkin's term), producing sound which bears no necessary semantic connection to the graphic itself.

55. Gutkin's paper is, by and large, an incisive and much-needed look at a fascinating and under-studied sector of music theory. He reads far deeper into the function and significance of strictly connotative notation than I am prepared to do here—I merely take issue with this particular characterization of Bussotti's work.

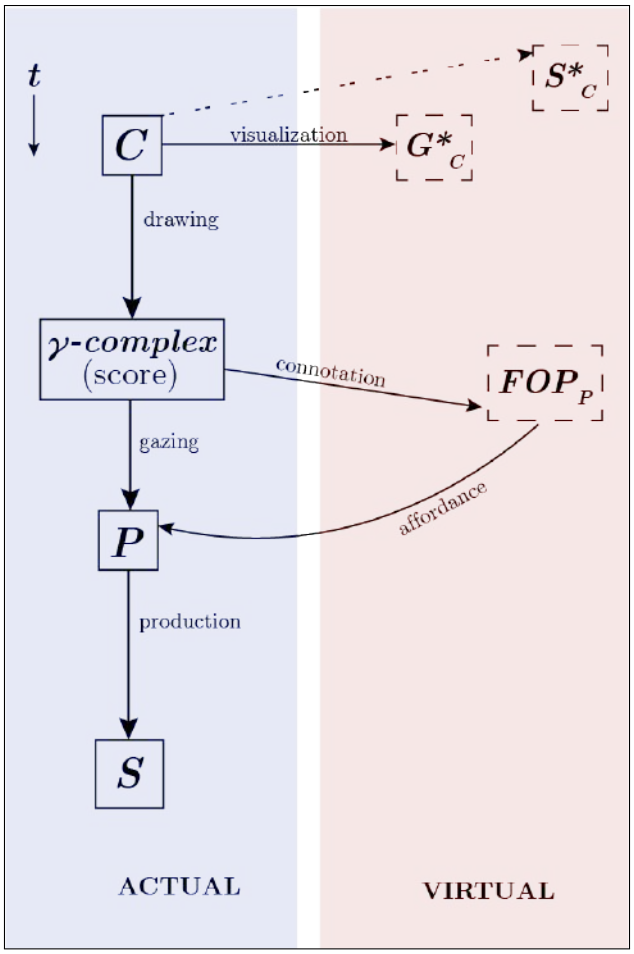


Figure 2.21: "Graphic" interaction model—to contrast with that of notation proper.

As far as my interests are concerned, though, the most pertinent strength of Ligeti's typology lies in its ability to meaningfully describe "hybrid" works/notations—i.e. compositions which integrate, often at quite a granular level, instances of denotative and connotative notations. If we accept his analysis that semantic and asemantic inscriptions, ("sign system" and "illustration") are two fundamentally distinct categories which nevertheless may "grow into one another," I take it that there are two fundamental mechanisms by which this hybridization may occur.[56]

First: Over the course of a score, section of a score, or even a single gesture, a composer may employ conventionally-coded symbols (of either traditional or neo-notation) *alongside*

56. Ligeti, "Neue Notation," 177.

asemantic inscriptions to be freely interpreted. We might dub this style "concatenative" hybridity. Figure 2.22 illustrates one such example which I engraved for Eric Revis in 2021. Painted "background" portions were provided with no accompanying code and were meant to provide improvisatory grounding for the traditionally- (or mostly-traditionally-) notated floating fragments.

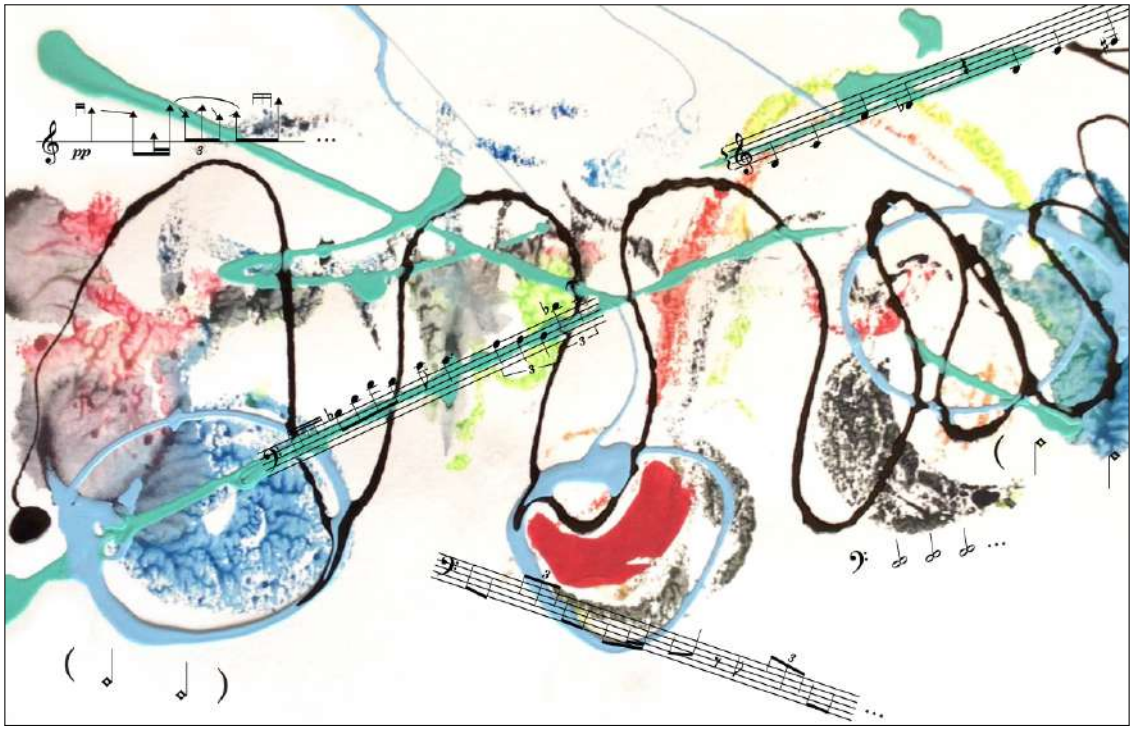


Figure 2.22: Score created *ex post facto* for Eric Revis' "Slipknots Through the Looking Glass #2" demonstrating "concatenative" hybridity. Traditional and modified-traditional notations are used side-by-side with non-coding graphics.[57]

Second: A single conventionally-coded symbol (either traditional or neo-notation) *itself* might demonstrate noteworthy "graphicality"—an ability to connote despite its separate,

57. Original performance by Eric Revis. Painting by Ayanna Bassiouni. Transcription/engraving by Isaac Otto. Recording from Eric Revis, "Slipknots Through a Looking Glass, Part 2," CD, track 7 on *Slipknots Through a Looking Glass*, Pyroclastic Records, 2020.

robust encoding—what we might dub "simultaneous" hybridity.[58] I take Cathy Berberian's *Stripsody* (1966) (shown in Fig. 2.23) to be a canonical example of this second form. Berberian provides explicit instructions for the interpretation of glyphs insofar as they conform to traditional $time \times pitch$ mapping on the x- and y-axes and standard notions of proportional duration/onset. However, each glyph (word) also demonstrates an "excess" of graphicality beyond simple decoration; presumably meant to influence the execution of that symbol in ways that remain un-coded.

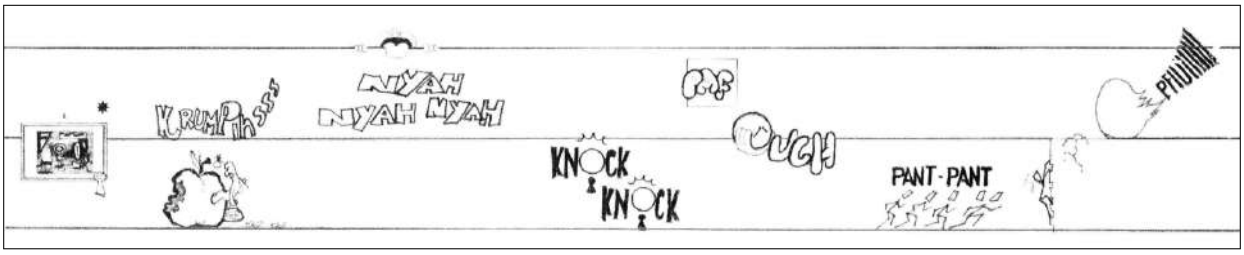


Figure 2.23: System three on page four of Cathy Berberian's *Stripsody* (1966) demonstrating "simultaneous" hybridity. Coded symbols themselves demonstrate connotative potential—i.e. "graphicality."[59]

Naturally, some questions remain: At what point may one claim that a notational symbol crosses over into meaningful graphicality—i.e. when does a symbol become sufficiently affective as to be able to impact performance via connotation? Precisely in which ways does this graphic excess serve to impact performance? On which factors is this graphic mediation contingent? At this point, answers to these questions would be essentially speculative, though it now seems possible to ask them empirically; in such a way that their answers might fall in the empirical domain of performance psychology and music cognition. Ultimately, I would argue that the mere ability to meaningfully raise these questions represents a new degree of subtlety in the discourse surrounding notation which would not be possible without Ligeti's

58. We might consider a third type: a semantically-coded symbol accompanied by or involving inscriptions which are strictly *incidental*; neither coded to constrain a field of potential action nor designed to incite performer-mapping. It's unclear whether we ought to even consider this "graphic excess" notation of any sort, or whether it's best thought of as mere decoration. We might consider *Belle, Bonne, Sage* shown in Figure 2.10 to be an example of this third mechanism—perhaps "decorative" hybridity.

59. Cathy Berberian, *Stripsody* (New York: C.F. Peters, 1966).

analysis.

2.4 Conclusion

To synopsize the main takeaways from the discussion presented in this chapter:

(1) It often behooves our analysis of the form and function of music notations to consider them not pictorial representations of past or potential future sounds, per se, but rather as generic coded instruction sets which denote particular mediated fields of potential musical action in performance. In order to serve as a music notation, these instruction sets must internally cohere according to a received syntax, arrived at either via the accretion of interpretive norms acquired over the course of a performer's musical education and experience, or given explicitly via the score itself.

(2) If we seek fuller understanding of the complex, multiform notations which have become more commonplace since the 1950s (and which show no sign of disappearing anytime soon!), it is important to have at our disposal a well-defined notation typology. This should address not only the graphic trace of the inscriptions used to mediate performance, but should also take into account their various mechanisms of action.

(3) Developing these definitions requires that we disabuse ourselves of certain antiquated notions surrounding the performance of scored music: namely, the notion that we might meaningfully distinguish "open" works from traditional "fixed" works. More robust definitions of extant notations should bear out that openness is a fundamental property of *all* human-performed music, including music encoded using traditional methods. The more meaningful question, then, is "In what way does this notation serve to mediate this music's openness?"

(4) As far back as the late 1950s, composers and scholars contemplated the properties, significance, and merit of new notations designed to enact sonically-indeterminate (i.e. "open") music. I've argued here that György Ligeti's 1965 essay stands as a valuable untapped resource demonstrating an uncommon degree of insight into these problems surrounding notation.

To wit, Ligeti describes a function-oriented notation typology separating semantic notation proper from asemantic graphics. Further, notation as such is classed according to the means by which it restricts performers fields of potential action—into result, action, and recipe notations. I assert that a modified Ligetian typology provides us with a valuable new set of tools with which to assess the way notation (and other musical inscription) mediates the often complex relationship between composers, musical texts, and performers.

In the following chapter, I will use these tools to examine two late twentieth-century work complexes by artists who have shown particular sensitivity in their use of neo-notations. These examples exist between and beyond commonly-understood notational binaries; demonstrating either deliberate "traversal" of the gradient between fixed and open denotative notations or poignant hybridity between the denotative and the connotative (or indeed both).

CHAPTER 3

HYBRIDITY & THE FIXITY GRADIENT IN TWO LATE-CENTURY WORK COMPLEXES: ANTHONY BRAXTON & HORAȚIU RĂDULESCU

> "The use of notation in creative improvised music has yet to be really examined in all its different permutations."
>
> Anthony Braxton, 1985.

In the previous chapter, I explored the possibility of a more robust typology of music notations such that we might more thoroughly assess the form and function of the twentieth century's thornier neo-notations. As a sort of a litmus test, this chapter will examine two work complexes[1] by composers whose fascinating compositional practices and musico-philosophical commitments lie particularly close to my heart. The goals of the chapter are twofold: (1) to demonstrate the efficacy of the Ligetian typology in describing notation (and how we interact with it) in greater detail and (2) to gain novel insights into the works of Anthony Braxton and Horațiu Rădulescu via a more thorough reckoning with thus far underappreciated aspects of their notation schemata.

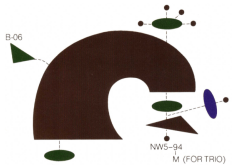
It goes without saying that these two artists represent two very distinct communities of practice; Braxton (b. 1945), a jazz-adjacent American composer/improviser known for incredibly variegated influences and tastes, and Rădulescu (1942–2008), a Romanian spectral composer renowned for his outsize personality and his pursuit of sound at the fringes of human psychoacoustic experience. As distinct as these backgrounds are, though, examining their scored works yields many fascinating parallels in the way they deploy dense, complex neo-notation in service of their musical aims. In contrast with many of the artists highlighted so far who have tended to stick to one neo-notational style, both Braxton and Rădulescu use notations across a wide gamut, including traditional and modified-traditional notations (both "result" and "action"), novel signs which affect tightly-constrained "micro-improvisation,"

1. Throughout this chapter, I use the term "work complex" to describe clusters of works related by notational similarity. Unlike many bespoke notation schemes, the schemata I'll examine here have succeeded in persisting across multiple works in their artists' respective oeuvres. Specifically, though I'll predominantly be looking at Braxton's *Composition No. 76* (1977) and Rădulescu's *Das Andere* (1984), I consider *No. 76* intimately bound up with related pieces such as *Composition No. 98* and the majority of Braxton's Ghost Trance corpus— similarly, *Das Andere*'s notation scheme survives in Rădulescu's fifth string quartet, Op. 89 *"before the universe was born"*.

relational symbols which constrain player gesture based on other performers' actions, and glyphs which provide uncoded spaces for improvisation based strictly on the performer's emotional state.

The first section of this chapter will, with as little commentary as possible, catalog these works' signs according to their content and function, illustrating where they fall within our adopted typology. Following this, I will compare these two artists' chosen tools so as to illustrate the subtlety and complexity in the ways artists construct unique notions of openness in their respective works.

3.1 Innovations in neo-notation

3.1.1  (*Composition No. 76*)

Though Braxton's oeuvre comprises over 400 numbered works (at time of writing), each of them deserving a good deal more scholarly attention than they typically receive, *Composition No. 76* (1977) merits singling out for a few reasons.[2] First, only a relatively small number of his works have been formally published and made available to the general public—and many of these only relatively recently. Of these available works, *No. 76* is by far the most complex in terms of its use of well-defined neo-notations and serves as a local apex in Braxton's musical and intellectual development during his flourishing in the mid-to-late 1970s. In contrast with the majority of individual pieces in Braxton's oeuvre, *No. 76* has attracted some degree of scholarly attention owing, ostensibly, to the excerpted module used as the cover artwork for Braxton's seminal 1978 album *For Trio*.[3] Prior to widespread availability of Braxton's

2. As is customary, I'll be referring to Braxton's works by their catalog numbers rather than by their proper graphic titles. While these titles (and especially their gradual change over the years) are fascinating in their own right, they unfortunately tend to typeset poorly. *Composition No. 76*'s graphic title is given in the section heading.

3. Anthony Braxton, *For Trio* (Arista - AB 4181, 1978).

scores, scholars boldly assessed the work based primarily on speculation surrounding this single module. Finally, in 2018 Paul Steinbeck published "Improvisation and Collaboration in Anthony Braxton's *Composition 76*"—likely the most thorough analysis yet of a single Braxton work—in an effort to rectify decades of incomplete scholarship.

Braxton belongs to a rarefied class of musical innovators who consistently orient their artistry toward the future. Using the same working method we ascribe to, say, Miles Davis and Karlheinz Stockhausen, Braxton frequently develops a novel compositional practice seemingly from whole cloth and takes it to a sort of aesthetic conclusion before eventually beginning anew. As such, his works taken as a whole demonstrate an incredible diversity of sound- and process-concepts which are encoded via widely disparate methods. These range from complex, rigorously encoded but unscored solo works, to early post-Webernian works (his term) written entirely in traditional notation, to pieces in the much more recent "Falling River Music" scheme written predominantly with strictly connotative, asemantic painting and glyphs. *No. 76* was written during a period in which Braxton consistently worked in several of these composition paradigms at once. As such, it displays a particularly dense, complex notation scheme, indebted to both American and European notational innovators like Cage, Feldman, Stockhausen, et al., as well as to the titans of Afrocentric improvised music on whose transcriptions Braxton cut his teeth.

Braxton has described *Composition No. 76* in a number of different ways. One of my favorite synopses (taken from Braxton's five-volume *Composition Notes* runs as follows:

> *Composition No. 76* was conceived as an expanded context for three instrumentalists that attempts to provide terms for creative exploration. The reality of this form was conceived as a dynamic sound continuum that emphasizes the collective interchanges of its composite ensemble - rather than the 'wonderful' soloist. [...]
>
> To experience this work is not to hear a continuous succession of events - in the sense of events that flow from momentum into its next materialization (or 'act') - rather in *Composition No. 76* there is a static 'dribble of isolated events that come together and apart without any sense of 'applied' momentum (or 'urgency'). This is a 'lifeless' sound space that is somehow happening in spite of itself.[4]

4. Anthony Braxton, *Composition Notes Book D* (Lebanon, NH: Frog Peak Music, 1988), 145–8.

For a more thorough grasp, one must look to the text of the score itself. Per its copyright page, *Composition No. 76* is a trio for improvising multi-instrumentalists, comprising "twenty-six pages of three-dimensional notation" organized into 20 paired modules (labelled {A1}–{A2} through {T1}–{T2}[5]) as well as seven pages of unison materials—also apparently modular—to be used in what Braxton dubs "structural sequences" throughout the performance.[6] Though not given expressly in the score, it is clear from the pair of performances on *For Trio* that module pairs may be performed in any order, though all three players take part in each module pair concurrently.

As a brief illustration of performance proceedings, Figure 3.1 reproduces the first pair of modules, {A1}–{A2}—a typical arrangement throughout the piece.

5. Mysteriously, a single module, {E}, contains three sub-modules; the first of which, {E1}, is composed only of a single whole note for Player 2.

6. Braxton, *Comp. Notes D*, 149.

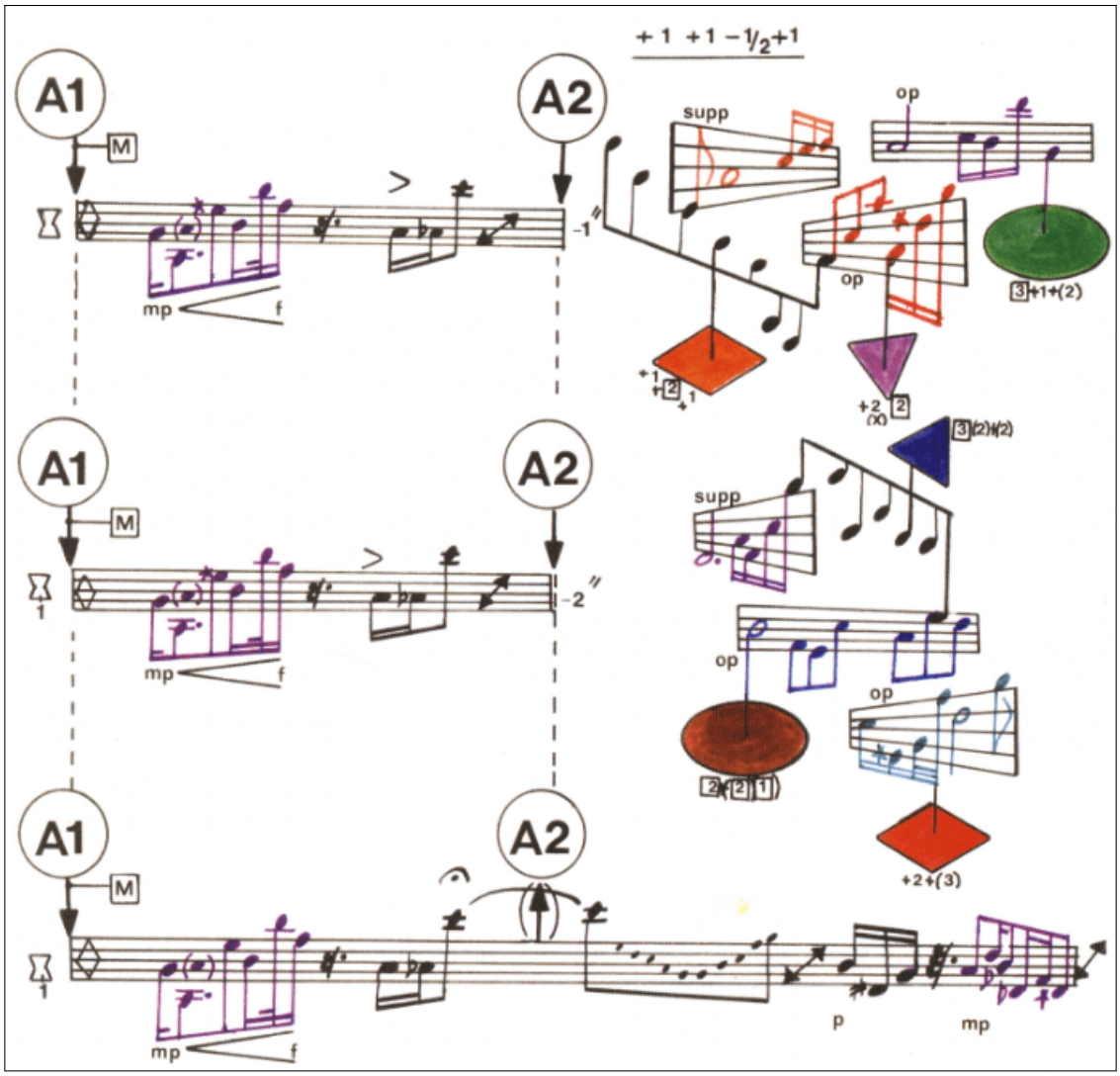


Figure 3.1: Module pair {A1}–{A2} from *Composition No. 76.*[7]

Over the course of each pair of modules, each player reads from left to right, either engaging in a more-or-less traditional fashion with the materials on standard staves (all three players in {A1}) or engaging with these seemingly opaque constellations of staff-fragments and geometric shapes as launchpads for constrained improvisation (players #1 and #2 in {A2}). The following section will be dedicated to thoroughly clarifying these materials so as to facilitate further discussion.

7. Anthony Braxton, *Composition No. 76* (New Haven, Conn.: The Tri-Centric Foundation, 1977).

Braxton's fixed material

In Volume D of his 1988 *Composition Notes*, Braxton describes *No. 76* as fundamentally composed of "fixed" and "open materials." As Steinbeck notes, though, these terms (at least under their typical usage) are essentially unable to fully capture the subtlety with which Braxton approaches his encoding scheme.[8] Braxton seems to take this fundamental division between the "fixed" and the "open" quite seriously—to the point that his performance instructions are delivered across two pages: one dedicated to each primary category of notation. Table 3.1 reproduces in full Braxton's neo-notational glyphs used in this fixed material—featuring both his stated instructions as well as my categorization of each glyph according to the modified Ligetian typology established in the last chapter. The granularity with which Braxton's notation operates necessitates two new terms in describing these symbols:

1. *inducement*—a glyph which by itself invokes a certain FOP in a performer, leading to the execution of some gesture and a resultant sound. (We might take the traditional example: an individual note-head, which signifies that some action is to be taken to produce sound.)
2. *modifier*—to contrast, a glyph which is used to modify some FOP by being appended to an inducement in one way or another. By itself (under normal circumstances) a modifier would not result in the performer taking any particular action—it is only when appended to a sounding glyph that a modifier can affect sonic results. (For example: the flags, beams, dynamic markings, and articulations which accompany the note-head).

Evidenced by Braxton's early Ghost Trance notation (discussed briefly last chapter), it is possible to deploy a highly stripped-down notation scheme—that is, one which eschews most modifiers in favor of only barely-adorned inducements. In this case, Braxton seeks to deliberately leave the bulk of the parameters normally described by a more full-featured notation up to the performer and thus omits those glyphs which would typically delineate said parameters. Nevertheless, Ghost Trance Music, along with every other notation scheme examined here (result, action, recipe, et al.) can be meaningfully described as some arrange-

8. Paul Steinbeck, "Improvisation and Collaboration in Anthony Braxton's Composition 76," *Journal of Music Theory* 62, no. 2 (October 2018): 254, ISSN: 0022-2909, https://doi.org/10.1215/00222909-7127682.

ment of various inducements and modifiers. Using these definitions, Table 3.1 presents and describes each novel symbol given on *Composition No. 76*'s first page of instructions.

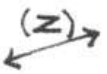
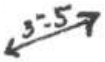
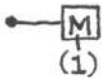
	Instruction given	Symbol	Comment
1.	"Match dynamics"		Relational, interpersonal. Recipe, modifier. Constrains dynamics.
2.	"Match dynamics but very softly"		(as above)
3.	"Play note then improvise for small amount of time"		Recipe, inducement. No appreciable constraint. *Appears in instructions but not in score.*
4.	"Hold until next cue point (suspension)"		Relational, interpersonal. Recipe, modifier. Fixed based on prior action taken.
5.	"Prepare just before time cue (and then execute)"		Modifier. Restricts onset time for execution of phrase.
6.	"Cue for someone else [...]"		Strictly informational. Orients performer with regard to other events in the score.
7.	"Can be used for vocal phrase"		Modifies improvisatory inducements. Relaxes constraint by expressly permitting vocal execution.
8.	"Wait for near the end of the time group to finish phrase point [...]"		Relational, contingent on elapsed time. Recipe, modifier.
9.	"Rest"		Result notation (silence), inducement. Duration potentially contingent on other players' actions.
10.	"Match instrument (that principle figure in time zone is playing) [...]"		Relational, interpersonal. Recipe, instrumental constraint. Modifier.
11.	"Change dynamics abruptly for next playing section [...]"		Relational, self. Recipe, dynamic constraint. Modifier. FOP excludes prior dynamic attributes.
12.	"Rest for 3 to 5 seconds"		Result notation (silence), inducement.
13.	"Change instrument quickly"		Relational, self. Recipe, instrumental constraint, modifier.
14.	"Independent tempo"		Relational, interpersonal. Recipe, tempo constraint, modifier. Unclear if tempo *must* be distinct or merely "uncoupled".
15.	"Match tempo [...]"		Relational, interpersonal. Recipe, tempo constraint, modifier.
16.	"Open clef"		Modifier. Relaxes constraint on phrase execution by incorporating transposition into FOP.
17.	"Sharp or flat"		Modifier. Relaxes constraint on note execution by incorporating transposition into FOP.

Table 3.1: Composer-provided list of symbols from Braxton's *Composition No. 76*.[9]

9. Braxton, *Composition No. 76*, instructions pg. 1.—Index numbers in this case correspond with those provided in the score.

Fixed notation in *No. 76* might be thought of as a heavily-modified form of traditional notation insofar as it features (1) traditional $time \times pitch$ mapping on the x- and y-axes; (2) (some) traditional clef indications; (3) phrases expressed using the dots, stems, and beams of traditional notation; and (4) other traditional modifiers such as dynamic markings, articulations, and fermate. By and large, this is the extent to which Braxton imports familiar symbols, though certain neo-notational glyphs replicate or tweak traditional functions despite their novel form. The new clef (16.) and new accidental (17.) (both long-time Braxton staples) in essence serve the same purpose as their familiar counterparts, merely adding another degree of openness to the score's realization by reducing constraints typical to a given musical passage. The bespoke symbol for "rest" (without modifier at 9. and with duration indication at 12.) simply serves as a proportional stand-in for typical absolute-duration rests. Likewise, while Braxton's new cuing symbols (5. and 6.) fill an important role in that they aid players in orienting themselves within material, they ultimately replicate functions available in traditional notation as well. (Color, insofar as it is featured in fixed material, also serves a "tweaked" traditional role, though I'll expand on this in Section 3.1.1.)

We also find, however, that Braxton employs many symbols which fulfill roles not typically found in traditional notation. Specifically, his novel relational symbols serve as important additions for a music which seeks to systematically constrain improvisers' creative output. That is to say: instructions 1., 2., 4., 8., 10., 11., 13., 14., and 15. all serve to mediate a performer's actions not based on a desired sonic product per se (i.e. some absolute factor) but instead based on the *relation* between the player and some other variable—either another player's actions (as in the "match dynamics" or "match tempo" indications) or one's own prior decisions ("change instrument quickly" or "change dynamics abruptly"). In both of these cases, the final outcome results from a confluence of an individual player's choices, all players' actions as a group, and the composer's meta-constraints established pre-performance.

To be sure, relational parameters are not exclusive to neo-notation. Dynamic markings and expressive texts found in traditional notation tacitly rely on relational parameters. For

example, when I read *ritardando* the precise rate of my slowdown depends upon that of my stand-mate. Likewise, the increase in amplitude from ***p*** to ***f*** is contingent on the loudness of my initial expression. However, symbols like Braxton's #8., 14. or 15. which *deliberately* (rather than incidentally) parametrize the gestures and sonic products of other performers are essentially foreign to the encoding schemes familiar to most musicians. Here, Braxton is making explicit what were predominantly implicit characteristics of prior notations.

Braxton's open material

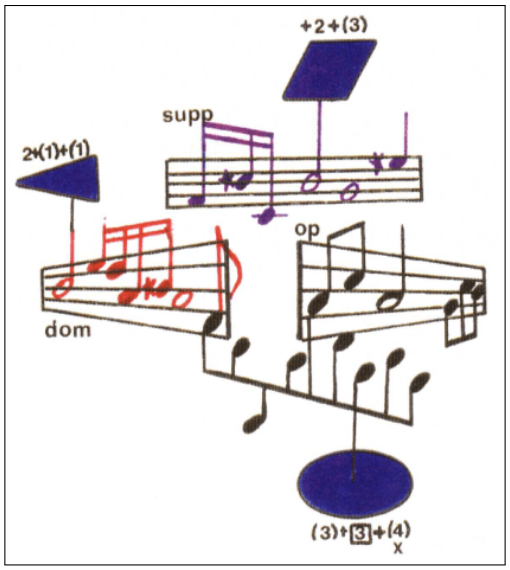


Figure 3.2: Open sub-module {F1} from *No. 76*.[10]

No. 76's open material is easily distinguishable by spatial separation ("floating" on the page without being tethered to a single staff) and by its geometry. Here we find the three-dimensionality Braxton referenced earlier: staves in open material are fragmentary and clef-less; seeming to emerge from and recede into the page as though they were two-dimensional projections of massy objects in space. Though now accompanied by constellations of modifier symbols, play is still oriented around these staff fragments, which may be approached non-linearly: that is, in any order. Per Graham Lock, it appears that an adequate realization of

10. Braxton, *Composition No. 76*.

these sub-modules requires that each staff-fragment be interpreted, though in no particular order.[11] In practice, a single "unit" of open notation consists of a staff-fragment in some orientation (implying a particular positionality in three-dimensional space). Notes inscribed on these staff-fragments typically appear in color, though they may also be rendered in the traditional black. Almost universally, these staff fragments are modified by an attached simple geometric shape filled with color. These appear to the reader to be ovals (full or truncated), irregular triangles, and skewed quadrilaterals, but are almost certainly intended to be equilateral triangles, squares, and circles subjected to the same system of projection as the staff fragments. Modifying these colored shapes are short sequences of numeric code. Finally, each open sub-module features one or more "linking" gestures comprising staffless eighth-note figures in black which share stems with two staff fragments (as shown in Figure 3.2). All explicit instructions pertaining to open material are given on the second instruction page and are reproduced in Table 3.2.

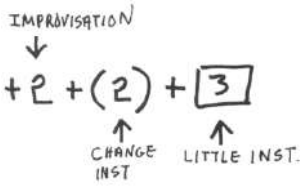
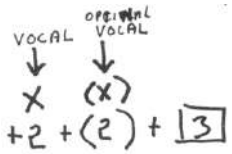
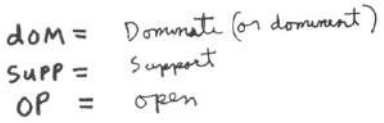
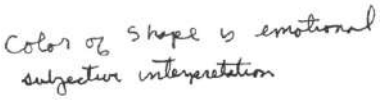
	Information	Note
A.		Numbers indicate number of notes/phrases per improvisatory sub-module (?). They may be modified with parentheses or squares.
B.		Improvisatory indices may also be modified with × or (×) indicating mandatory or optional use of vocals for improvisation.
C.		Relational signifiers orienting improvisation in one of three ways with regard to other performers.
D.		Expressly indicates presence of performer-mapping as critical component of performance.

Table 3.2: Supplementary instructions from Braxton's *Composition No. 76.*[12]

11. Graham Lock, *Forces in Motion: The Music And Thoughts Of Anthony Braxton*, New Edition (New York, N.Y: Da Capo Press, March 1989), Postscript 3, ISBN: 978-0-306-80342-0.

As is clear from the given instructions, Braxton's open material is still subject to rather stringent restrictions. In its execution, open material is divided into clusters of improvised gestures induced by each staff-fragment/shape combination. These clusters comprise a rendering of the modified-traditional notation within the staff-fragment as well as a series of notes or phrases delimited by the codes of the form $\{+i+j+...+n\}$. Parenthetical or square modifiers indicate a change of instrument in between soundings or the use of the AACM signature "little instruments", respectively.[13] Elements of the numeric code may be accompanied by $\times$ or $(\times)$, indicating mandatory or optional use of the voice in the specified improvisation-group.

Open material features its own bespoke relational signifiers. DOM, SUPP, and OP indicate that an improvisatory cluster should either dominate, support, or remain un-coupled from the prevailing ensemble texture. These are distinct from the "fixed" relational symbols in that they demand significantly more creative interpretation—i.e. restrict a performer's FOP much less. Where "match dynamics" or "change instrument quickly" are rather straightforward in their interpretation and feature very little ambiguity, DOM and SUP modifiers are not merely functions of greater/lesser dynamic or density. Rather, they require a performer to assess in-the-moment the sort of gesture which befits a given sonic environment from among an essentially infinite array of potential actions.

Braxton's distinct use of color in *No. 76* almost certainly accounts for a significant portion of interest (scholarly or otherwise) in the score. Per Table 3.2, the only instruction explicitly given in the text with regard to color is the rather vague pronouncement that "color of shape is emotional subjective interpretation." Of course, colored inks not only appear in the geometric figures, but were used to inscribe both open and fixed phrases as well. Graham

12. Braxton, *Composition No. 76*, instructions pg. 2.—Note that Braxton opts not to concretely define the fundamental unit of improvisatory action signified by the numeric code. Steinbeck claims it might refer either to notes or phrases.

13. Ekkehard Jost, *Free Jazz* (New York: Da Capo Press, 1994), 170, ISBN: 978-0-306-80556-1.—A "little instrument" is a (typically small) auxiliary percussion or wind instrument deployed to add color or break up the prevailing texture. These include but are not limited to "slide whistles, recorders, harp, Japanese koto, harmonica, kazoo, police whistles, thunder sheet, bells and gongs, plus countless other percussion instruments."

Lock, perhaps the most widely-read Braxton scholar, describes the intentions behind this color scheme in a footnote:

> The colour code to *Composition 76* is actually based on astrological correspondences. That is, Braxton selected a set of the emotional characteristics attributed to various signs of the zodiac and then designated them in the score by using the colours associated with the same signs. The code is: blue = sombre or moody (Saggitarius); red = explosive or intense (Aries); green = calm, restrained or contained (Taurus); violet = vibrant or pulsing or energetic or vigorous (Pisces); brown = complementary or harmonious or balancing (Libra); yellow = strong, lyrical or bright (Leo).[14]

In a related 2008 paper, Lock reiterates much of the same information but adds:

> Shades of colour mark factors such as dynamic and tempo: the darker the hue, the faster and/or louder you play.[15]

That Braxton opts not to disclose this important scheme in the text of his score is interesting in and of itself and will be revisited in a later section. For now, though, it suffices to say that taken whole, the graphic elements in his open material are neither fully denotative nor fully connotative. If we take the code given by Lock at face value, color inside shapes (and presumably when applied to traditional notation as well) serves essentially as once-abstracted expressive text which applies to a given improvisatory expression; a stripped-down rendering of instructions of the form "*con eleganza*," "*molto agitato*," "*doloroso*," etc. Clearly, however, certain aspects of these signs remain un-coded. The shapes' forms, for instance; their precise positioning relative to the staff fragments; the virtual orientation of the staff fragments themselves with respect to the viewer—each of these factors poses a "graphical excess" connoting additional factors which appear to be strictly performer-mapped.[16] Worth

14. Lock, *Forces in Motion*, 222.

15. Graham Lock, "'What I Call a Sound': Anthony Braxton's Synaesthetic Ideal and Notations for Improvisers," *Critical Studies in Improvisation / Études critiques en improvisation* 4 (May 2008), https://doi.org/10.21083/csieci.v4i1.462.

16. Erica Dicker, "SA16: Ghost Trance Music," *Sound American*, no. 16: The Anthony Braxton Issue (2016), http://archive.soundamerican.org/sa%5C%5Farchive/sa16/sa16-ghost-trance-music.html.—These symbols recur frequently throughout Braxton's oeuvre and are discussed at length (independent of any one composition) in his *Tri-Axium Writings* and elsewhere. They make their most prominent appearance in his later "Ghost Trance Music" composition series, where they serve as "jumping-out" points where performers leave the prevailing (written) musical material to improvise before returning at another iteration of the same symbol. Triangle, square, and circle correspond to, respectively: "synthesis or correspondence logics;" "stable logics;" "mutable logics."

noting is that at a base level, Braxton's open notation functions much in the same way as his fixed material: i.e. by providing sequences of inducements flanked by various modifiers. This is very much not a given for other forms of un-coded open notation, which may well bundle together graphic elements in such a way that individual glyphs are impossible to parse as providing any one particular function (e.g. Cardew's inscriptions in *Treatise* discussed last chapter).

Unknowns

Despite its position as one of Braxton's most-discussed works (and despite Braxton's own commentary in his *Composition Notes*), certain notational elements still remain fundamentally opaque; either by design or because of incomplete knowledge on the part of its analysts. For completeness' sake, I'll reproduce these here in Table 3.3.

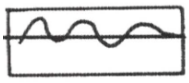
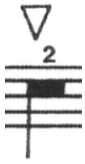
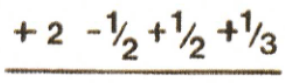
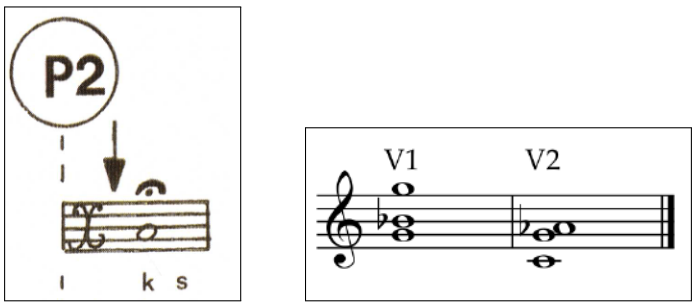
	Information	Note
1.		"Mirrored-C" or "$\mathscr{X}$" clef which occurs sporadically throughout the score.
2.		Action notation in the form of sinusoidal line in structural sequences.
3.		Rectangular notehead in structural sequences.
4.		Example of additional numeric code appended to each open sub-module. Not to be confused with improvisation modifiers shown in Table 3.2.

Table 3.3: Glyphs of unknown significance in *Composition No. 76.*[17]

Listening to the two "canonical" extant recordings yields some insight. First: A simple whole-note figure using the un-referenced "mirrored-C" or "$\mathscr{X}$" clef results in distinct chords

17. Braxton, *Composition No. 76.*

in the two versions (shown in Figure 3.3). A fair assumption might be that the clef serves as a yet more open version of the diamond clef where onset and duration are relatively fixed and precise pitch is held open. This seems to be confirmed by Tri-Centric Foundation Archives manager Carl Testa, who, in reference to a sketch of the much-earlier *Composition No. 6E* (1968), writes that "[t]he score features an "X" clef which indicates to the performers that exact pitch reproduction is not required [...]" (though the glyphs do not match precisely).[18]



(a) in score **(b)** transcription (conc.)

Figure 3.3: "Mirrored C" or "$\mathscr{X}$" clef at sub-module P2 in V1/V2 on *For Trio*.[19]

Next: The sinusoidal line typically reserved to signify trills in other works seems to indicate open improvisation with a duration limited by cues. Performances on the album render this symbol using rapid switches between instruments, long tones, short bursts of sound, etc., and vary considerably in length. The rectangular notehead (resembling the *maxima* from medieval/Renaissance mensural notation) occurs infrequently, but seems to be rendered simply as a slightly longer quarter-note pulse. Lastly and perhaps most mysteriously: I can find no reference to the "secondary" numeric codes which appear appended to each open sub-module. Unlike their coded counterparts which describe attributes of improvisatory "clusters," numbers in these secondary codes appear signed (either "+" or "−") and include fractional values—neither of which pertain to the prior code given in Table 3.2. Again, as is often the case in Braxton's work, it remains unclear whether these symbols' lack of well-defined function (at least as explained in the score) serves as a deliberate omission or an

18. Carl Testa, *Composition No. 6E*, November 2022, https://tricentricfoundation.org/composition-no-6e.
19. Braxton, *For Trio*, 2:27–3:18 of Version 1 and 4:44–6:03 of Version 2.

oversight, or whether perhaps their function was so clear to the participants as to have made their explicit definition unnecessary. I will return in greater detail to this notion in a later section.

In sum, an individual performance of *Composition No. 76* proceeds as follows: Pre-performance, performers decide upon a particular ordering of module-pairs and fixed structural sequences. In executing these module-pairs, players seamlessly slip between engagement with more restricted linear interpretation of fixed materials and omnidirectional interpretation of open materials; all the while maintaining certain temporal, dynamic, and structural relations with regard to other performers. Though Braxton thinks of these fixed and open performance paradigms as distinct modes of play, it's clear from examining the notation that this distinction is, in the end, quite blurry. Before moving on to discuss the import of Braxton's notational choices, however, I would like to pivot rather abruptly to another work complex by an unlikely kindred spirit—one in whose work we'll see many noteworthy parallels and perpendiculars.

3.1.2 *Das Andere* & Op. 89 *"before the universe was born"*

In contrast with other composers willingly or unwillingly linked to the spectralist paradigm, Horațiu Rădulescu has, for a variety of reasons, received considerably less scholarly attention. Known among fans and detractors alike for his outsize personality, his "convoluted, jargon-heavy writing", and most of all for his highly idiosyncratic sound worlds, Rădulescu parallels Braxton insofar as he is often seen as an "outsider" in his field.[20] More than anything else, Rădulescu's particular flavor of spectralism is characterized by a fascinating form of sonic indeterminacy he dubs *sound plasma*. So dense and poly-timbral as to resist traditional descriptors, *sound plasma* comprises a range of techniques including "sparkling, irregular

20. Martin Suckling, "Rădulescu: The Other Spectralist", *Tempo* 72, no. 285 (July 2018): 20–40, ISSN: 0040-2982, 1478-2286, https://doi.org/10.1017/S0040298218000074.

trill[s]," "irregular arpeggios [...] with extreme *flautando* bowing," and "irregular, breathy 'phase shifting' timbre[s]," all of which combine in myriad ways to (ideally) produce the galaxies of resultant sum and difference tones which Rădulescu seeks.[21]

This section concerns a work complex comprising two of Rădulescu's compositions, *Das Andere* (1984) and Op. 89, *"before the universe was born"* (1995), for unaccompanied viola and string quartet, respectively—two pieces which epitomize his pursuit of this elusive *klangwelt*. For Rădulescu, *Das Andere* represented an early attempt to solve the problem of adapting plasmatic music—usually reliant on complex, chaotic interactions between multiple sounding bodies—to a single instrument.[22] To that end, he developed a fascinating, singular notation scheme to facilitate his measured indeterminacy. Evidently, this experimental foray was successful enough that he continued to deploy elements of *Das Andere*'s notation throughout his career (albeit with various mutations), including in Op. 89.[23]

Of Rădulescu's predilection for new notations, Liviu Marinescu explains:

> [...] his desire to notate differently came from the need to compose differently. [...] For centuries, the Western world had worked slowly on developing a notation system that removed approximation between what was seen, what was played, and what was ultimately heard. Horațiu Rădulescu saw this old routine as a significant obstacle in the creation of plasmatic music, which is why he sought to return much of the initiative and creative power back to the performer.[24]

In the following sections, I will demonstrate precisely how and to what extent Rădulescu was able to achieve this "transfer" by closely examining the unique notational syntax and semantic content developed for these two pieces.

21. Francis Heery, "Sound Plasma: Horatiu Rădulescu's Oto-utopia," *Tacet* 4 (2016), ISSN: 978-2-84066-777-3.

22. Liviu Marinescu, "Horațiu Rădulescu and the Intangible Dimensions of Plasmatic Music," in *The Oxford Handbook of Spectral Music*, ed. Amy Bauer, Liam Cagney, and William Mason (Oxford University Press), 10, ISBN: 978-0-19-063354-7, https://doi.org/10.1093/oxfordhb/9780190633547.013.22.

23. This fact is noteworthy in and of itself given that experimental notations typically fail to live past the age of a single piece.

24. Marinescu, "Horațiu Rădulescu," 1.

Rădulescu's notation scheme—denotative factors

Notation in *Das Andere*/Op. 89 is a form of *tablature*—a subset of action notation which encodes actions pertaining to the relationship between player and instrument-body.[25]. *Das Andere* (being the simpler case) features staff lines representing the four strings of the viola, arranged from high to low.[26] As in traditional guitar/lute tablatures, most symbols used in Rădulescu's system reflect positions for the player's left hand. Unlike guitar tablature, however, where fret positions represent the subdivision of a particular string into sectors allowing for pitches in 12-tone equal temperament, numeric position values in Rădulescu's works most often represent the locations of natural harmonics on the string. For instance, a "7" on the uppermost staff line would indicate that the player ought to place a finger at the 7th-harmonic position on string I of the viola. Also unlike traditional tablature, this position marker by itself does not signify a particular sounding—as when one plucks a harmonic on guitar incited by "⋄", for example. Rather, *Das Andere* and Op. 89 feature specific sets of actions meant to sound these harmonics in different ways.

There are two primary sets of actions Rădulescu employs in the pieces (analogized as "play characters" in his supplementary material) represented by *alpha* (𝔸) and *sigma* (Σ) in the score.[27] Given that these function as mutable, flexible notations which themselves might be modified by subsidiary symbols, I think of these as "second-order" notations which cluster together complex performance parameters into comparatively neat packages; much in the way that the baroque "turn" reduces a complex set of actions down to a single glyph, which itself is modified by key signature, tempo, meter, etc. In a series of instruction pages provided with *Das Andere*, Rădulescu gives quite detailed instructions regarding the execution of each of these primary and subsidiary second-order symbols. For instance, regarding the first such

25. This is to say: per Chapter 2, syntactic relations between signs in tablatures do not map to resultant sounds in the same way they would in result notations like our traditional pitch-centric notation.

26. To be precise, Instruction pg. 1 subtitles the piece "for a stringed instrument tuned in perfect fifths." Rădulescu has since published an alternate score for 'cello which he also suggests be used for violin or double bass.

27. Horațiu Rădulescu, *Das Andere* (Lucero Print, 1984), dedication page.

symbol in *Das Andere*, Σ, he gives:

> The Σ modules of biphony are to be performed as very irregular melodies resembling high Alp-horns. When dynamically very loud, the "colliding" pitches of the double stops produce differential sounds (δ). Their very irregular melodic shape should never use periodic rhythm or glissandi.
>
> Play always *legatissimo* (and as much as possible *liscio*, i.e. changing the bow direction unobtrusively). The dynamic should vary within a wide range in order to shape the macro-form. Simultaneously the dynamic of the micro-forms works independently and sometimes even contradictory to the global one. The micro climaxes of the [v-figure] should not be played as sforzandi but instead as high speed crescendi/decrescendi. [...]
>
> Even with increased bow-pressure noise in the very high register, the natural harmonics used by Σ should always sound beautifully rough, primitive and wild like imaginary high Alp-horns. Do not filter them whistle-like pitches.[28]

Likewise, for 𝔸, he gives:

> The 𝔸 [...] technique consists of very irregular arpeggios [graphic] with very F (flautando) and ↘ (fast bowing), and with a lot of point of contact changes ±VP ↔ MT.
>
> The chord components must be allowed to resonate (lasciar vibrare), and when the score contains blank segments between the flourishes of apreggios, the [*u du 'u du*] or [*little devils*] technique (the "obsessive voice" ➡) is to be performed.
>
> Thus all the 𝔸 sequences are fast and aperiodic dialogues between the arpeggios and the momentary ➡, releasing rich timbre, pitch and register information like an irregularly perforated polyphony.[29]

Rădulescu's neonotation, including these "play characters," the lesser second-order symbols, and associated modifiers are reproduced in Table 3.4 and Table 3.5.

28. Rădulescu, *Das Andere*, Instruction pg. 1.
29. Ibid., Instruction pg. 3.

	Definition	Symbol	Comment
1.	"Open string"		Basic indication that note to be played is not a harmonic but on open string. Recipe notation, inducement.
2.	"Multiphonic"		Multiphonic on one string. May be modified by other glyphs. Recipe, inducement.
3.	"U du 'u du"—"phase shifting bow; rebouncing of the bow in between two imaginary walls; with rigid arm"		Shorthand for specific body-action constraints in service of a particular indeterminate but constrained sound-field. Recipe, inducement.
4.	"Little devil"—"high melody of natural harmonics (via unstable [harmonic] played with only one finger [...])"		(As above.)
5.	"Sigma (Σ)"—"[...] two very high but powerful simultaneous melodies of natural harmonics [...]"		"Second-order" symbol modified by harmonic indications which induces complex "micro-improvisatory" gestures. Recipe, inducement.
6.	"Alpha (Ⱥ)"—"arpeggios of open strings [...] using very aperiodical micro rhythm"		(As above.)
7.	"High natural harmonics"—"high natural harmonics in LASCIAR VIBRARE [...] alternating with the open string"		(As above.)
8.	Bow speed—slow		Modifier.
9.	Bow speed—fast		(As above.)
10.	Bow pressure—flautando		(As above.)
11.	Bow pressure—premuto		(As above.)
12.	Phonetic rhythm—synchronous		Modifier pertaining to phonetic rhythm of *Tao Te Ching* inscriptions.
13.	Phonetic rhythm—shifted		(As above.)

Table 3.4: Composer-provided list of symbols from Rădulescu's String Quartet No. 5 (1993), used also in *Das Andere* (1984).[30]

30. Horațiu Rădulescu, *Before the Universe was Born, Op. 89* (Lucero Print, 1993).—Instructions apply as well to the earlier *Das Andere* (1984).

	Glyph	Definition
1.	F	flautando (very little pressure)
2.	=	normal [pressure]
3.	V	premuto (increased pressure)
4.	SP	sul ponte
5.	VP	verso il ponte (near the bridge)
6.	pT	un poco sul tasto
7.	mT	molto sul tasto
8.	MT	moltissimo sul tasto

Table 3.5: Additional modifiers given on Instruction pg. 1 of Op. 89.

Note that, like Braxton, Rădulescu uses novel symbols not only for situations which would be clumsy or entirely untenable to notate using traditional techniques, but also for greater economy in notating fairly common modifiers (flautando, sul pont., sul tasto); albeit ones which would typically be expressed in text above a staff rather than with a bespoke glyph. Figures 3.4 and 3.7 demonstrate typical deployments of 𝔸 and Σ gestures, respectively.

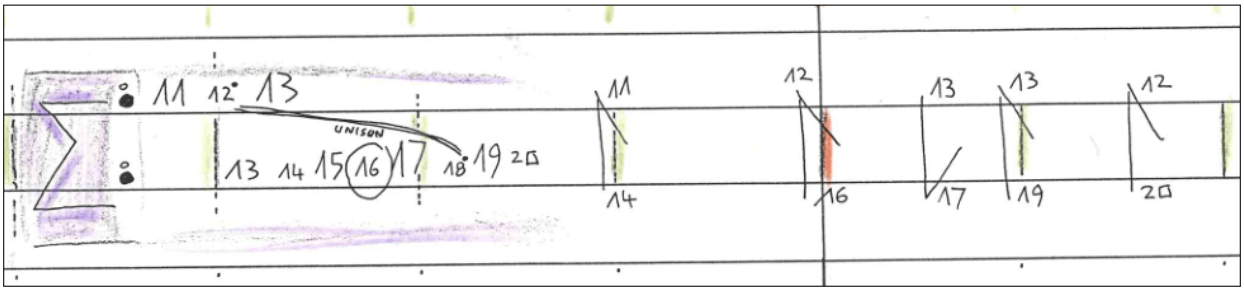


Figure 3.4: Typical deployment of a Σ figure in *Das Andere*.[31]

In Figure 3.4, we find that the Σ spanning strings II and III is modified with a series of natural harmonic indices: 11–13 on string II and 13–20 on string III. These are not meant to be sounded "in position' as one might expect under traditional notational syntax. Rather, these indicators provide a space for potential action; granting the performer a degree of creative latitude over the sounding events that happen at a particular time. Specifically, in what appears to be blank space on the staff, the performer is to create the aforementioned

31. Rădulescu, *Das Andere*, 12.

"irregular melodies" on both strings simultaneously using the fingering positions provided. Rădulescu helpfully provides a "graphic simulation" of the intended "biphony" between two strings on Instruction pg. 1, shown in Figure 3.5.

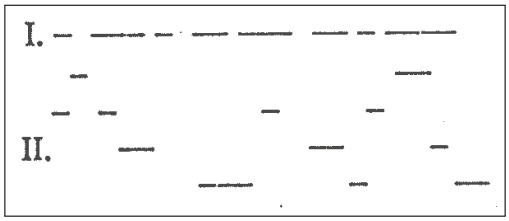


Figure 3.5: "Graphic simulation" of intended Σ biphony in *Das Andere*, per Instruction pg. 1.

Σ modules are often interrupted by "tick mark" symbols featuring a single harmonic index subscript and superscript (see Fig. 3.6). These tick marks indicate, per Instruction pg. 1, "micro climaxes" in the continuing irregular melodies. In these instances, harmonic indices are meant to sound simultaneously for a duration proportional to the length of the glyph's "tail," creating (under ideal circumstances) emergent sum and difference tones.[32]

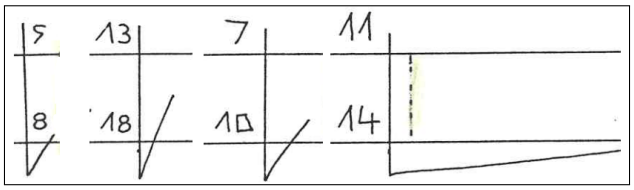


Figure 3.6: Σ melody micro-climaxes of various lengths in *Das Andere*.

A modules, on the other hand, encompass an entirely distinct set of gestural parameters. In lieu of a biphonic melody, each A demands that a performer fill the staff's "blank space" with what Rădulescu calls the "obsessive voice" (shown with ➡); involving an irregularly bowed drone on the indicated string which alternates with *u du 'u du* or *little devil* gestures (see Figure 3.7). Here, the left hand is mostly locked in one position. Specific pitches are

32. I can find no positive reference to the directionality of the micro-climax figures (i.e. why they sometimes appear with the "hook" toward the top of the staff rather than to the bottom). I suspect, from observing several performances, that it refers to the relative priority of the fingered harmonic in the climax. Similarly, the size with which Σ harmonic indices are printed and the presence of circled indices seem to be indicators of a desired relative prominence.

given at the beginning of the module which are intended to sound (albeit fragmentarily) thoughout the module. Where several pitches are indicated (as on string IV in Fig. 3.7), the player may transition between them at will. During an 𝙰 module, the staff is frequently cut through with wavy vertical striations which indicate rapid arpeggios. That they only ever appear upright is an indication that (like grace notes, for example) they in essence occupy no time at all on the y-axis. With reference to these striations, Rădulescu specifies:

> The strict time distribution of the arpeggios, and the strings to which they apply [...] should be rigorously respected. Free is only:
>
> - the direction of the arpeggios (𝄐 or 𝄑)
> - the speed of their deployment, and
> - the point of contact along the strings. NB this should vary as much as possible but not during one bow.[33]

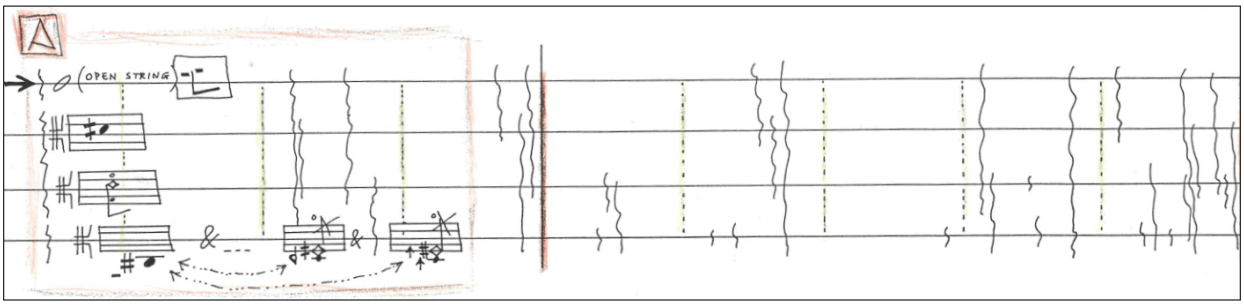


Figure 3.7: Typical deployment of an Alpha figure in *Das Andere* with "obsessive voice" shown on string I.[34]

Thus, the arpeggios are encoded similar to other forms of proportional notation. Given that the space between dotted vertical lines on the staff universally indicates a two-second duration, the performer must to the best of their ability map the onset of the arpeggio to its approximate location between these waypoints. Note that Rădulescu is uncommonly specific here with regard to the syntactic conventions of his novel scheme; recognizing the ambiguity of his signs and therefore specifying precisely which musical parameters remain open for creative performer intervention and which must be faithfully reproduced according to the composer's desires.

33. Rădulescu, *Das Andere*, Instruction pg. 3.
34. ibid., 4.

Given their unconventional specifications and their prevalence in the score, it is worth briefly explicating the "lesser" combinatory gestures which often form part of Σ and 𝔸 modules. The *u du 'u du* and *little devil* signs (#3. and 4. in Table 3.4) themselves serve as technique "aggregators," second-order notations clustering together complexes of techniques which yield consistent but variegated and indeterminate sound. For each of these Rădulescu provides a recipe for their execution as well as a vivid verbal descriptor. *U du 'u du* gestures are given formally in the score as

$$\text{very fast bowing } (\searrow) \; F \,\&\, \pm VP \nwarrow\!\!\searrow mT$$

indicating consistently fast and *flautando* bowing with extreme variation between *verso il ponte* and *molto sul tasto*. He goes on to provide additional physical/gestural and sonic constraints. For instance, he mandates that the "bowing requires a stiffly locked arm" and that the bow should "[change] direction very abruptly and unpredictably like the instantaneous mouvements [sic] of the Nō Theatre." Sonically, he specifies four important components which ought to be perceivable at all times: (1) the fundamental, (2) "breathing noise," (3) "rich variation of the harmonic content" (4) "an uneven 'panting'-like rhythm."[35] *Little Devils*, to contrast, are given as

$$\text{very fast bowing } (\searrow) \; \pm F \,\&\, VP \leftrightarrow SP$$

indicating consistently fast bowing in a narrower range between *verso il ponte* and *sul pont*, with fluctuation between *flautando* and *premuto*. As before, Rădulescu gives specific parameters for execution: the performer should "[caress] a small part of the string in *capo tasto* slowly and irregularly" producing "a bright and metallic sound," "a cloudy phenomenon with very high register erruptions like sparklings."[36] These signs, along with the more conventional *multiphonic* and *high natural harmonic* glyphs, belong to a class of symbols again basically absent from traditional notation: specifically, signs which simultaneously

35. Rădulescu, *Das Andere*, Instruction pg. 2.
36. Ibid.

prescribe a particular set of physical gestures and a diffuse, uncertain resultant sound-world that nevertheless remains predictable at a larger time-scale.

Rădulescu's notation scheme—connotative factors

While Rădulescu overtly acknowledges his notation's openness by explicitly delineating certain freedoms allotted to performers in 𝔸 and Σ modules, he stops short of expressly identifying "fixed" and "open" materials as Braxton did in *Composition No. 76*. As demonstrated above, the large majority of his neonotational signs are well-defined; almost to a stifling degree. Nevertheless, properly open, un-coded notation plays a subtle but important role in the *Das Andere*/Op. 89 work complex. Even a cursory glance at the scores of the two works reveals Rădulescu's frenetic, untamed copy-style. Both works are predominantly hand-written in the author's unpretentious print (save the title pages, *Das Andere*'s instructions, and certain text in Op. 89), and no particular effort seems to have been made to keep the physical trace of the symbols consistent from page to page. To the contrary, Rădulescu's signs exhibit a sort of expressive graphicality all their own; not to the extent that it begins to inhibit legibility, but certainly to the extent that a performer might begin to interpret the symbols differently than had they been more traditionally engraved (digitally or otherwise). Though only really involving a few types of large-scale gesture, the staves often seem to display an excess of information—especially in the latter work (see, for instance, Figure 3.8).

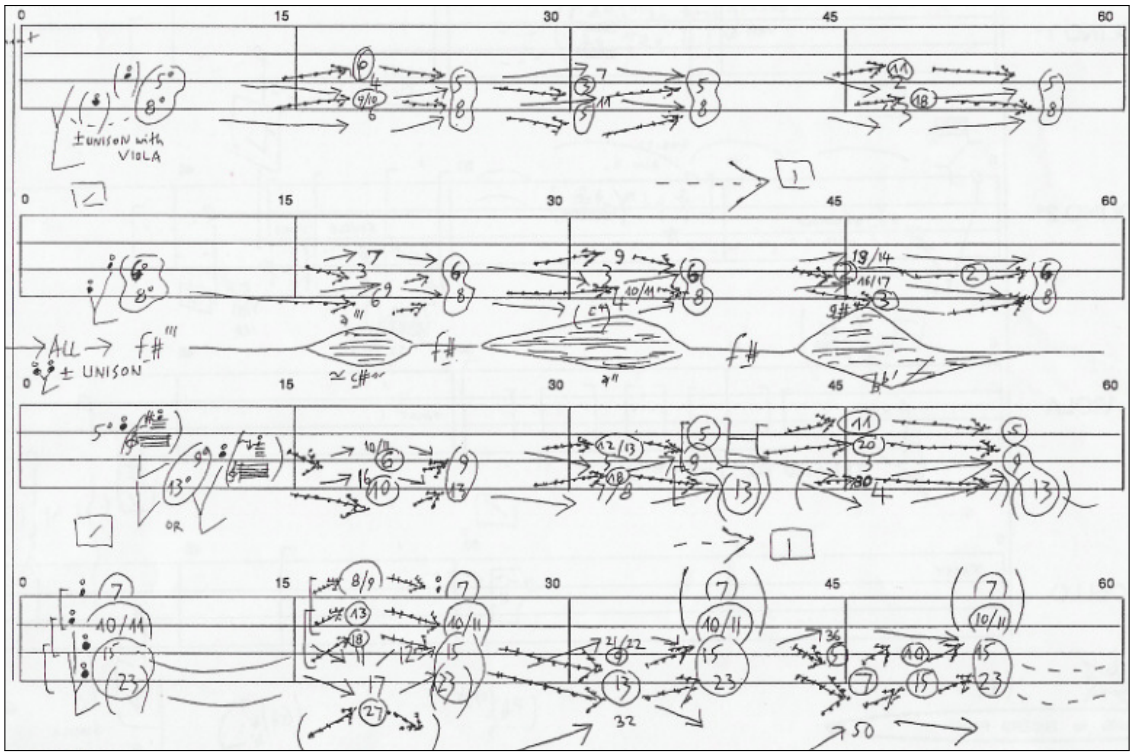


Figure 3.8: Well-defined symbols which nevertheless demonstrate graphical "excess" in Op. 89.[37]

Featuring material outside of the primary A or Σ gestures, the material on pg. 23 of Op. 89 functions more like a typical tablature; providing positions of natural harmonics on which performers are to place their fingers. With regard to the two types of arrows, Rădulescu gives the instruction to "choose opposite tendencies with regards of those [sic] of your next instrument," indicating that performers ought to navigate the given pathways according to their neighbors' actions-in-the-moment. While these actions are all clearly-defined micro-improvisatory actions (of a sort to which the performer has by now grown accustomed), I contend that the frenzied inscription itself has a high potential to bleed through into performance; lending it a particular affect commensurate with its dense, high-energy scribble. Throughout the entire score, simple and complex information alike is presented with a similar scrawl; connoting a rapid and improvisatory compositional method.

Finally, Op. 89 in particular employs text-as-notation in a particularly idiosyncratic,

37. Rădulescu, *Op. 89*, 23.

tricky way. The upper margin of each "playing" page of the score displays an excerpt from a translation of ancient Chinese poet-philosopher Lao Tzu's *Tao Te Ching*. For instance:

we work with being, but non-being is what we use[38]

if you want to be reborn, let yourself die[39]

he creates confusion in those who think that they know
practice not-doing![40]

While countless scores feature thought-provoking epigraphs and enigmatic expressive text meant to influence performance to a greater or lesser degree, Rădulescu's work is unique in that, true to form, he provides a full-page rubric on the text's interpretation (shown in Figure 3.9). This rubric, taking the form of a three-axis diagram, asks that the performer "try to realize in sound" three clusters of interpretation-mediating factors: {magic, symbolic **writing**, IMAGE}; {**rhythm**, phonetic spectrum, SOUND}; {meaning, notational communication, **idea**, THOUGHT}. To be clear, despite the reference to Lao Tzu at the top of the page, I take it that these three axes are intended to hold sway over all aspects of Op. 89's interpretation—not strictly the text.

38. Rădulescu, *Op. 89*, 11.
39. Ibid., 22.
40. Ibid., 3.

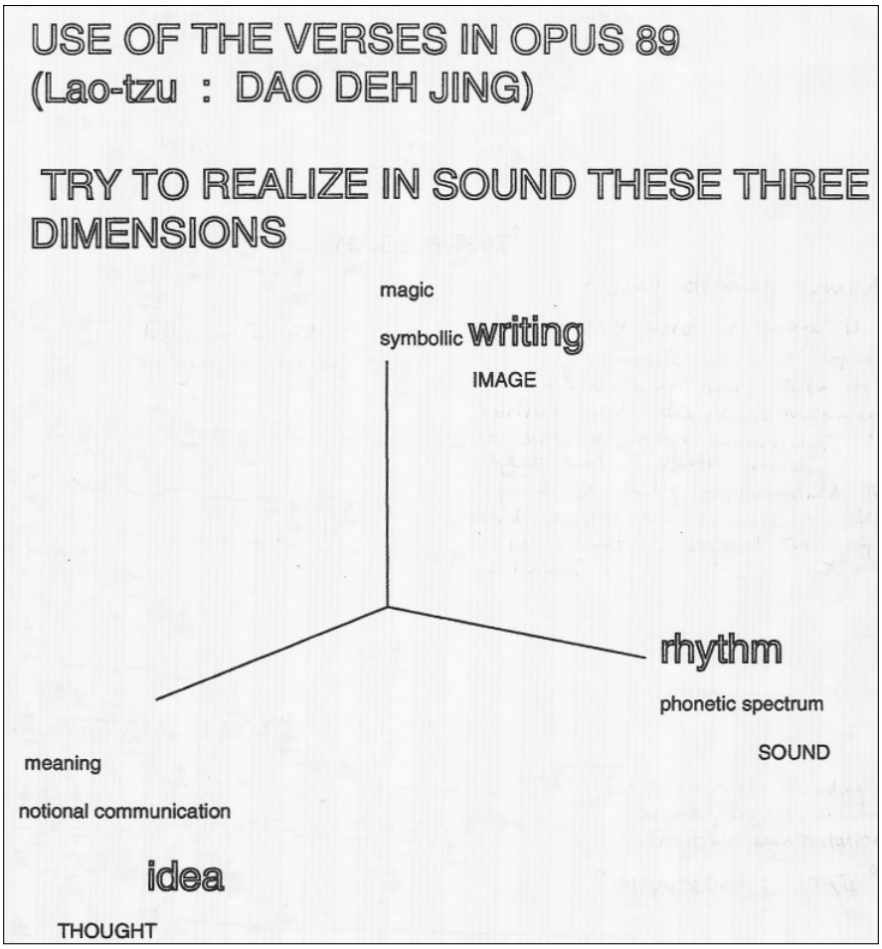


Figure 3.9: Three-axis diagram representing the balancing act Rădulescu requires of the performer.[41]

The "idea"-axis seems to be the most concrete: "meaning" and "notational communication" clearly refer to the notion that the performer should consider the concrete, denotative content of Rădulescu's glyphs—i.e. what they communicate. To "realize [...] sound" via this axis is to straightforwardly interpret the score according to the detailed guidelines provided. Similarly, the "rhythm"-axis pertains to aspects of interpretation which are semi-concretely inscribed. While these phonetic/rhythmic elements are (uncharacteristically) poorly-detailed in the score's notes, William Dougherty clarifies:

> The natural phonetic rhythm of these text fragments determines the rhythm of the passage below them, sometimes precisely and sometimes more impressionistically. When

41. Rădulescu, *Op. 89*, Instruction pg. 3.

> the symbol of a vertical line enclosed in a box is indicated, the players execute the phonetic rhythm of the text above in synch with the other players with the same symbol, while when the symbol of a (forward) slash enclosed in a box is indicated, the players execute the phonetic rhythm of the text above *out of synch* with the other players. While this aspect of performance is admittedly not entirely clear from Radulescu's performance notes, an explicit example on page 13 of the score allows one to see his intent clearly [...] In this example, Radulescu actually notates the rhythm of the text – six quavers divided into two groups of three. This corresponds to the phonetic rhythm of the text directly above, 'love the world as your self'.[42]

Thus, per this axis, the text's semantic content (i.e. their meaning as used in conversational language) is entirely inconsequential. Rather, it is the phonetic makeup of the text which is to influence performance. As Dougherty explains, however, this influence is not all together straightforward. While certain (usually simpler) phrases lend themselves particularly well to the mapping process Răduescu demands (i.e. one syllable per note), far more of them require that performers find individual solutions; bespoke syllable-to-rhythm mappings.

The third, "writing"-axis abstracts the performer's relationship to notation to the greatest degree. To "realize [...] sound" in this dimension is to permit the inscriptions to act as expressive text of a particularly elusive sort. Many traditional expressive texts (*espressivo*, *doloroso*, *con fuoco*) are so common as to verge on concrete technique indications and could thus be considered a form of denotative notation in their own right. That is to say—when a composer uses "*doloroso*" in a score it is (unless otherwise specified) assumed that s/he intends a softer, slower performance than were it marked "*aggressivo*." Rădulescu's texts, however, do not afford the performer the luxury of this familiar quasi-denotative content. To allow a text like "the eternal void/older than GOD"[43] to materially impact performance (as prescribed by the tri-axial diagram) is to engage in a particularly radical form of performer-mapping.

It is worth noting here that both *Das Andere* and Op. 89 eschew, for the most part, traditional expressive text proper (that is: of the form "*doloroso*" rather than "*col legno*

42. William Dougherty, "On Horatiu Radulescu's Fifth String Quartet ('Before the Universe was Born') Op. 89," *Tempo* 68, no. 268 (2014): 37, ISSN: 0040-2982.—Though Dougherty is rather detailed with regard to Rădulescu's notational practice, he neglects to speculate on the particular role that each axis of interpretation might play in performance—reducing Lao Tzu's text to its phonetic structure. His assessment here clearly refers particularly to the "rhythm"-axis—leaving us to consider the impact of the other two.

43. Rădulescu, *Op. 89*, 4.

battuto"). The former contains a single indication to "*[...]* INSIST ON THE "FRESHNESS" OF THIS G♯-SPECTRUM" on pg. 13. The latter similarly features only one indication: "CON PASSIONE ET INTERIORITÀ" on pg. 5, though if the piece is to be rendered faithfully, performers of Op. 89 must maintain constant awareness of the current page's inscription and its expressive connotation.

3.2 Comparison via distinctions in notation

Having now examined, in a rather dry and pedantic way, the bare mechanics of these two distinct work complexes, we can begin to ask more sophisticated questions regarding their composers' notational choices. In advance of that, though, it is important to take stock of precisely what we've observed.

Though the aesthetics of their inscriptions and the ways they choose to encode performer action vary greatly, there are no small number of similarities between Braxton's and Rădulescu's works. For instance, both complexes function differently from traditional ink-on-paper compositions as we've come to know them. In the last chapter I argued that for any useful definition of "openness" in musical composition, all works intended to be performed live by human actors are non-trivially "open." It is clear, however, from our observation and listening that *Composition No. 76* and *Das Andere*/Op. 89 take this further; embracing openness as a core tenet of their compositional processes in a way that other, more traditional works, do not (indeed *can* not given the limitations of their notational technology). This openness manifests itself both in the final sonic products resulting from the compositions' interpretation and, critically, in the way performers interpret the glyphs on the page.

Both composers use a raft of symbols and other illustrations to encode their works—from commonplace to wholly alien—which vary in the extreme with regard to the degree of constraint they place upon their interpreters. In both cases, these glyphs take the form of incitements to act or sound in a particular way as well as modifiers which mediate these

actions/soundings. Though these notation schemata are often startling in their graphicality, the traits listed above are on the whole not uncommon and could fairly be attributed to any number of mid-to-late-century works. Armed, however, with a more thorough understanding of the ways open notation mediates performance according to its semantic content (or lack thereof), one may begin to explore in earnest the profound gap which separates these two composers and their works. In the following section, I'll be comparing Braxton and Rădulescu along three axes: (a) the brute syntactic structure and semantic function of their adopted notation schemes in the aforementioned works, (b) the function of their notation in relation to body, process, and sound, and (c) the role that their notational choices (as regards openness) play in reflecting or articulating the tenets of their underlying philosophical frameworks.

3.2.1 Traversal and hybridity

The last chapter ended with a brief elucidation of two concepts which I take to be crucial to our assessment, i.e. *traversal* and *hybridity*. As a brief refresher:

Traversal (specifically fixed/open traversal) occurs when a system of notation is so constructed as to allow for the encoding of more-strict and less-strict instruction sets; affording narrower or broader fields of potential action to the performer, respectively. A composer who engages in traversal uses notation to tighten or loosen performance constraints over the course of a single work. This may occur gradually or suddenly or wax and wain throughout the work. Trivially, of course, traversal of this sort occurs regularly in traditional composition. Jazz compositions exhibit traversal insofar as at first, during performance of a tune's head, the performer is more tightly constrained in creative output by the "mandatory" recitation of the melody—then becoming less constrained during improvisation over the tune's chord changes. Likewise, a strictly notated piece of classical music might feature a section marked *ad libitum* to indicate a passage involving less performer constraint. However, traversal is at its most interesting when it is deployed either for its own sake, for that of deliberately mediating the predictability/reproducibility of a musical work, or for the sake of engaging

multiple distinct creative faculties of performers (as, for instance, we find in the present works). Traversal proper, as I've defined it, occurs when transitioning between symbols which are predominantly *denotative*, i.e. well-defined; varying strictly in the degree to which they constrain action, not in the way they are mapped to meaning.

Hybridity, on the other hand, (specifically connotative/denotative hybridity) occurs when well-defined symbols (mapped to meaning by convention or by the composer directly) occur alongside glyphs (or features of glyphs) which bear no fixed semantic content and must be "manually" mapped to meaning by the performer—either ahead of time or in-the-moment. In the last chapter, I described two types of hybridity. *Concatenative* hybridity occurs when composer-mapped symbols are directly juxtaposed (spatially/temporally) on the page with strictly connotative performer-mapped glyphs. Here the performer must "shift gears" from the act of reading to a dual act of mapping and interpretation. *Simultaneous* hybridity, to contrast, occurs when composer-mapped and performer-mapped elements are combined and must be dealt with simultaneously. Here, concrete, well defined symbols which incite action directly might be modified by performer-mapped modifiers or vice-versa.

Traversal in *No. 76*

Composition No. 76's focus on modularity lends itself to deliberate parametrization of gestural fixity by keeping its many modes of play distinct and well-defined. While there is no set order to the modules, performance often involves regular and sudden changes to the degree of constraint over potential action. Though this traversal occurs both within and between modules, (at least as regards his more fixed materials) Braxton seems to favor giving each performer a single level of gestural fixity per module. A simple example: In "Version I" from *For Trio*, play proceeds from module pair {J1}–{J2} to {F1}–{F2} beginning at 4:44.[44] Here, Player 3 moves directly from a short $\mathscr{X}$-clef system ending with a rest and quick instrument change to a system in bass clef. Given that the $\mathscr{X}$-clef (historically, at least, for Braxton)

44. Steinbeck, "Anthony Braxton's Comp. 76," 259.

is interpreted as a melodic contour map, permitting the staff to be read "approximately" with any absolute pitches desired, the transition from {J2} to {F1} represents the point of traversal. This takes the form of a sudden "squeezing" of action potential via the addition of a single constraint: the need to observe the traditional bass clef.

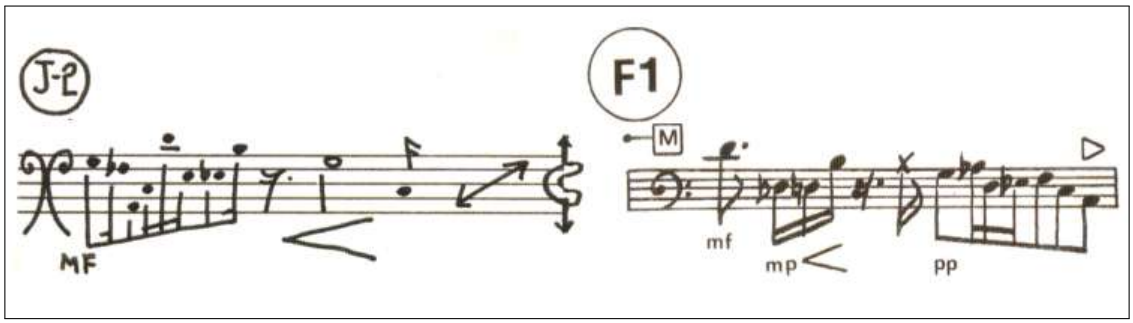


Figure 3.10: Player 3's transition from {J2} to {F1} as read in "Version I" on *For Trio* (5'20")

Indeed, Braxton even goes so far as to develop bespoke notational mechanisms for this fixity traversal in the form of his numeric codes accompanying improvisatory "open" modules.[45] Within a single module, players must regularly negotiate shifting codes attached to improvisatory inducements which flexibly constrain actions taken in response. Again in "Version I," Player 1's first sub-module {H1} is an "open" one. Here, bracketing for the moment specifics of the inducements (colored shapes) themselves, Player 1 may address any of the following codes:

$$[3] + (2) \ + \ (3) - - - \text{OP} \tag{3.1}$$

$$\underset{\times}{(2)} + (2) \ + \ [1] - - - \text{SUPP} \tag{3.2}$$

$$+1 + (2) \ + \ (3) - - - \text{DOM} \tag{3.3}$$

If, for instance, I opt to begin with the first code, the brackets surrounding numeric

45. Please forgive the continued scare-quoting of "fixed" and "open" in this section. I use these to differentiate Braxton's use of the term (to refer to his floating improvisatory sub-modules) from my own (to refer to the properties of notation at large).

elements denote that my creative expression is (sequentially) constrained by (a) which little instrument I decide to use for my first three tones/phrases, (b) which (primary) instrument I use for the second two and (c) which remaining instrument I'll use for the last three. This, of course, is further mediated by the presence of the OP code found on the attached staff-fragment indicating that my actions should be categorized "open"—i.e. that they need not be influenced by my bandmates' actions. Executing any of these available combinations requires that the performer account for a constantly shifting network of constraints involving instrument choice, use of the voice, number of attacks, and relationship to other players.

Gestures using fragmentary traditional/modified-traditional notation call for yet further traversal. Any time a player moves from a "fixed" to an "open" sub-module or back, he is suddenly confronted with new relational, temporal, or pitch-wise constraints which vary depending on the particular module. These constraints can be seen to change even within a given "fixed" gesture. Figure 3.11 illustrates sub-module {B1}, in which the notes' durations are determined first by both relational and fixed parameters (whole note at a matched tempo), then by strictly relational parameters (stemless notes marked with cue arrows), then back to fixed parameters. Likewise, the phrase's dynamic is first determined collectively (the "k") then absolutely (***ff***).

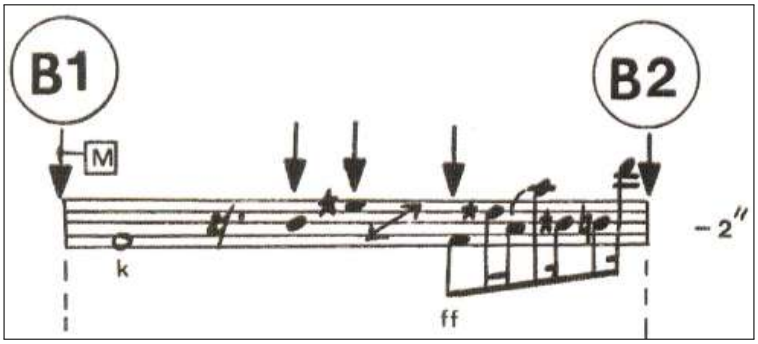


Figure 3.11: "Fixed" sub-module B1 for Player 1 in *Composition No. 76.*

Perhaps predictably, material in the "fixed" structural sequences (found after the 20 primary modules) deals with traversal in a far more disciplined manner. Here, though the

base material is already considerably further open than traditional notation (with sequence 1 featuring a single-line staff and 2 featuring the diamond clef), play proceeds linearly and in unison. Only with the appearance of the "boxed sine wave" glyph (which, again, does not appear in any symbol key) does play break open into seemingly unconstrained improvisation with duration delimited by the next cue point.

In sum, Braxton's large repository of well-defined symbols and codes allows notational fixity (i.e. the precise degree of constraint of player action) to be treated itself as a very finely gradated independent variable. While fixity traversal of this type is not entirely uncommon (especially among neo-notational or improv-centric works), the extent to which it suffuses *Composition No. 76* and similar subsequent works is a crucial aspect of what makes Braxton's work so singular.

Traversal in *Das Andere*/Op. 89

Rădulescu's traversal takes an entirely distinct form. From the first page of *Das Andere*, constraints over performance are under continual flux. Unlike in *Composition No. 76*, the player has no say over their assigned material at any given point in time. Rather (as with traditional notation) they must engage with each symbol as it appears, with time demarcated by dotted verticals indicating 2" durations.

The opening gesture of the work, an eight-second attack on the 7th harmonic of string I, immediately gives way to a complex Σ gesture; an incitement to begin biphonic improvisation. In this simple traversal, the performer transitions from a field of potential with fixed finger position—ergo fixed pitch—and a narrow acceptable rhythmic accent profile to one with (constrained but) indeterminate position/pitch and more open rhythmic profile. Then, on page two (system two), Rădulescu tightens the constraints once again with a dyad on strings I and II—freezing the "melody" in place (see Fig 3.12).

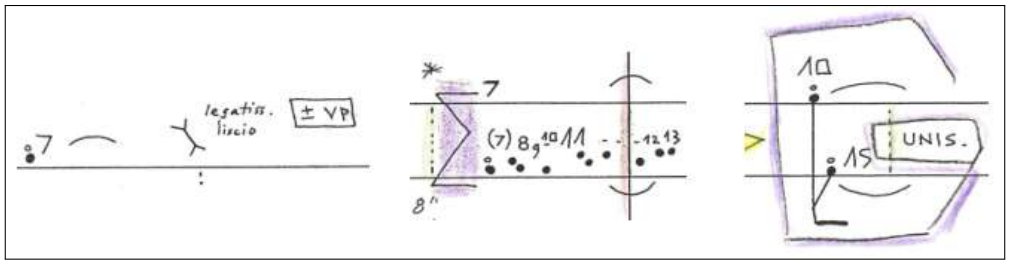


Figure 3.12: *Das Andere*'s first three gestural territories.

Whether written in deliberately or not, the pacing of this traversal becomes an important aspect of the gestural topography of the work. Inflection points where players transition from more stringent to looser restrictions correspond fairly consistently with sonic density. Within the space of only four systems (on pages four and five), Rădulescu moves from open-melody Σ to more fixed A (itself complicated by several optional pitches on string IV) to an entirely fixed-pitch dyad. Further, these Σ gestures themselves contain yet finer gradations of fixity: the simple transition from "little devil" to "u du 'u du" (see Fig. 3.13) involves also transitioning from (loosely) {indeterminate left hand, fixed right hand} to {fixed left hand, indeterminate right hand} in essentially no time at all.

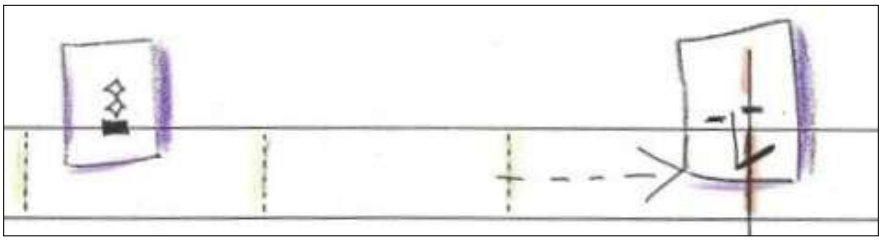


Figure 3.13: Excerpt from *Das Andere* (pg. 5, sys. 2) illustrating transition from "little devil" to "u du 'u du".

The player must not only rapidly shift between modes of sound production (as is common in all sorts of musical paradigms) but between multiple gradations of fixity in the process. This constant traversal is at the core of Rădulescu's "micro-improvisation"—a term he uses, it seems, to refer specifically to A and Σ environments, but which fairly applies across the entirety of both works discussed.

The three additional players in Op. 89 allow Rădulescu to further expand the breadth of his traversal; now encompassing inter-musician relational constraints. Like Braxton, Rădulescu uses bespoke symbols to modulate the gestures available to the symbols' interpreters; rendering these gestures contingent, realistically, on the bodily movements of one's fellow performers rather than, say, their sounds. The presence of the boxed vertical "|," as mentioned above, denotes a mandatory synchrony between players' otherwise improvisatory gestures. Figure 3.14 presents this technique *in situ*: the second violin's micro-improvisatory *lasciar vibrare* gesture is executed in a rhythm loosely dictated by the phrase at the top of the page.[46]

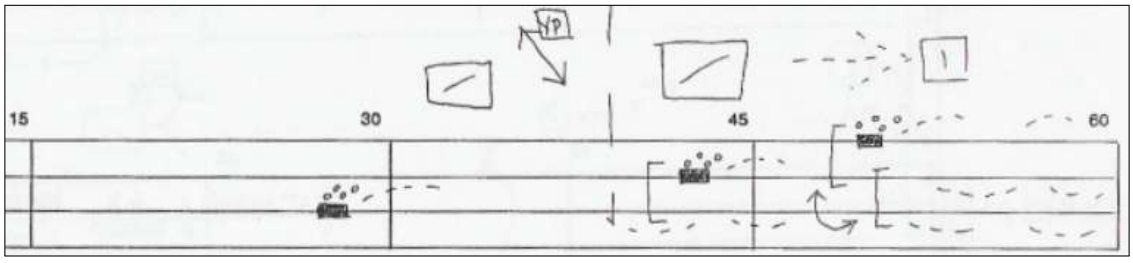


Figure 3.14: Op. 89, pg. 10, second violin part demonstrating micro-improvisatory gesture modulated by relational signifiers.

These relational signifiers result in an FOP highly restricted in terms of finger position (natural harmonics on the specified strings only) and therefore pitch, but only loosely restricted in terms of rhythm (loosely related to the phonetic rhythm of the provided text). Indeed, as early as the second page of Op. 89 we find that Rădulescu calls for the following:

...that is, for a marked asynchrony of phonetic rhythms gradually transitioning to total synchrony with other players. This, in essence, directly imposes fixity traversal—this time smoothly rather than disjointedly—from a field of potential action entirely uncoupled from other players to one which requires close monitoring of their actions. To be clear, this is more significant than merely altering a single musical parameter over time (e.g. via a hairpin

46. Rădulescu, *Op. 89*, 10—"can you coax your mind from its wandering and keep to the original oneness—can you cleanse your inner vision until you see nothing but the light?"

crescendo, etc.) in that it fundamentally restructures the performer's entire network of potential action; now made to respond to real-time factors external to the score. The player's degree of creative liberty itself is made into a manipulable variable—mediated here by these bespoke glyphs.

To be clear, these traversal techniques are not deployed out of Rădulescu's impulse toward co-composition or to somehow meaningfully engage the generative capabilities of competent improvisers. Rather, for Rădulescu, these are simply sophisticated means of gradating the relative degree of indeterminacy at each given point in the score. Under these conditions, notational fixity becomes yet another variable (alongside global dynamic, raw sound density, density of harmonic material, etc.) which might be used to paint a dramatic arc into the structure of the work.

Hybridity in *No. 76*

Of course, these work complexes would not merit inclusion here if it weren't for the fact that they demonstrate significant hybridity as well. To return to Braxton for a moment, *Composition No. 76* seems to eschew the notion that a score must enumerate every relevant detail pertaining to its realization. As mentioned above, there are a number of "unknowns," i.e., aspects of the notation's code which were evidently communicated elsewhere; deemed so self-evident as to not merit inclusion; deliberately kept opaque as an artistic decision; or simply forgotten. These omissions (which no doubt stymie any would-be Braxton analyst) highlight a critical distinction between his and Rădulescu's compositional paradigms and indeed their communities of practice as a whole. Throughout this chapter, I have, perhaps to a fault, attempted to homogenize the conceptual frameworks and terminologies used to discuss open music practices and their associated notations across both of these overlapping fields. To my mind, this allows for a no-nonsense discussion of the brute realities of the various forms of musical literacy without recourse to unnecessarily multiplied and obscurant categories of work—e.g. "improvisatory music;" "indeterminate music;" "aleatoric music;"

"jazz-adjacent music;" etc. The reality of the matter, though, is that close study of this notation reveals precisely how large of an impact can be felt from the broad differences between these communities of practice.

To gloss quickly over what is undoubtedly a fascinating and worthwhile discussion: Braxton's musical context is one which prioritizes first and foremost the "realness of the moment".[47] While it would be unfair to claim that all aspects of the document are wholly negotiable, it is undeniable that unknown or ill-defined elements in the score would not pose the same moral quandary to *No. 76*'s players as they would to Rădulescu's ensemble. So, while I use "connotative," or "performer-mapped" to refer to any element that *given the constraints elaborated in the score* lacks well-defined semantic content granted by the composer, I recognize that (seated in the *No. 76*'s original context) these same elements may have functioned entirely differently from performance to performance depending on the demands of the situation. In the end, I take it that this flexibility and moment-centric orientation of the work strongly jibes with the dominant ethos in jazz and other Afrological improvisation paradigms which formed the core of Braxton's (and his bandmates'/co-composers') musical upbringing. This view is buttressed by close-listening to performances of *No. 76*. Per Steinbeck:

> Sometimes [the performers] interpret the open material rather freely instead of adhering to the notation, and these passages tend to sound more improvisatory, with fast-paced, linear melodies that depart from the steady rhythms and wide intervals of the *Composition 76* score. In contrast, Braxton and his collaborators on "Version II" [...] typically begin with gestures derived from the notated contours, colors, and codes.[48]

Clearly, what constitutes faithful interpretation of the printed work in this context looks very different from what is typically considered appropriate in the Western art music paradigm.

Nevertheless, *No. 76* and *Das Andere*/Op. 89 now exist as works which have in some sense transcended their original context. Both scores are, at time of writing, freely available for purchase and might readily be picked up and performed entirely divorced from their initial context.[49] Given that many aspects of this contextual detail are now essentially closed off

47. Braxton, *Comp. Notes D*, 149.
48. Steinbeck, "Anthony Braxton's Comp. 76," 266.
49. ...whether or not this is well-advised is unfortunately beyond the scope of this essay.

except to the works' originators, we (as students of the works themselves) have no recourse but to treat these un- or incompletely-defined elements as essentially dependent on performer contribution; i.e. as "performer-mapped" or "connotative" elements.

The colored-shape inducements featured in "open" improvisatory sections serve as a prime example of this tension. Lock identifies that at some point prior to *No. 76*'s performance, Braxton identified a fleet of "emotional characteristics" ostensibly meant to modulate the piece's "improvisation bursts" via (in essence) a form of expressive text. However, barring discussion with Braxton himself or finding one of the few scholarly resources which detail these characteristics (never mind the problem of deciding how, precisely, to faithfully translate "brown = complementary or harmonious or balancing" into concrete musical terms), the aspiring performer would be left high-and-dry; only able to confront these glyphs as blank symbols waiting to be re-mapped. After all, per the text of the score, Braxton expressly grants that colors are subject to "emotional subjective interpretation."

Therefore, delineating the boundaries of Braxton's denotative/connotative hybridity is significantly more problematic than it might be in contemporary works like Bussotti's (mentioned last chapter) in which undefined elements are squarely that: undefined. In the end, though, whether or not we bracket these issues it is clear that Braxton deliberately developed interlocking structures of denotative/connotative notation to particular ends. Whether his color scheme is interpreted as once-abstracted expressive text or as an entirely un-coded, performer-mapped subsystem, the score's interpreters, upon encountering colored materials, experience a decisive shift in the type of musical literacy they're meant to employ. Even in the case that (despite the instruction's omission from the score) we are meant to take a brown circular glyph to indicate improvisatory material which is "complementary or harmonious or balancing," there is simply no fact-of-the-matter as to how these attributes are to be instantiated in sound.

To focus entirely on Braxton's semi-defined color scheme, however, is to ignore several other critical performer-mapped glyphs. While color is the one predominantly connotative structure

which bleeds over into "fixed" material in the score, Braxton reserves others exclusively for his "open" environment. Most prominent of these is the undefined three-dimensionality which pervades the score; sometimes barely noticeable, other times extreme. Despite serving as one of the most visually arresting elements of the printed work, it seems that (unlike his use of color) Braxton never even hints at the notion that the z-axis is meant to materially impact performance in a controlled or rigorous way. Likewise, while Braxton explicitly references an attempt to "integrate color and shape variables into the operational scheme of the music - as a basis to generate fresh creative responses from its instrumentalists," no positive rubric is given to differentiate, say, a red oval from a red quadrilateral.[50]

These, along with the other "undefineds" mentioned in the last section all point to a particular orientation toward compositional hybridity of the type defined above. Specifically, Braxton opts to integrate connotative materials of two distinct types: those which are clearly intended to be mapped and ought to have concrete sonic results (e.g. color) and those which remain fundamentally mysterious; able to be taken either as mere decoration or as a sort of notational "excess." By providing these "excess symbols" (really, empty variables awaiting mapping), Braxton fascinatingly permits the performer to take on an even higher-level role as co-composer; deciding not only *how* a graphic trace is to impact performance, but indeed whether or not a given element is to serve as notation at all.

50. Braxton, *Comp. Notes D*, 143.

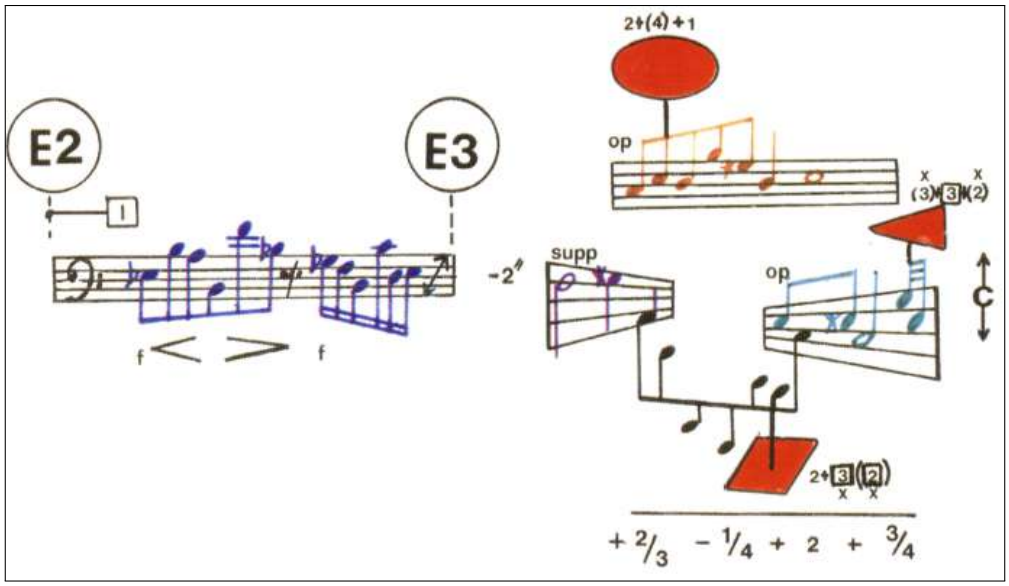


Figure 3.15: Sub-modules {E2} and {E3} for Player 1.[51]

Figure 3.15 illustrates this principle in action in sub-modules {E2} and {E3}. In {E2}, Player 1 reads and executes a phrase for bass clef with traditional rhythmic and dynamic constraints (with the caveat that looser reproductive constraints apply; commensurate with written works in the AACM lineage). The blue stems and noteheads, though, indicate—depending on which view one takes—either a "sombre or moody" coloration or some as-yet-undefined emotional affect to be mapped to blue-ness by the performer. The concurrence of well-defined traditional glyphs which induce some action and undefined notational attributes which modulate that action point to *simultaneous* hybridity. Shifting to {E3}, however, upsets the paradigm entirely. Now Player 1 must assemble a sort of patchwork of mixed read/improvised fragments. Many elements in this pool of latent material retain familiar mappings: presumably, per the letter of the score, rhythmic indications in staff-fragments still obtain here. Alongside these denotative elements, however, are the improvisatory inducements themselves: the red oval, triangle, and quadrilateral. Though these markers are themselves modified by well-defined parameters (the numeric codes discussed in the last section), their many *undefined* attributes (position in 3D-space, type of shape, point of connection to

51. Braxton, *Composition No. 76*.

staff-fragment, mystery code) challenge the player to ascribe to (some or all of) them some distinction; sonic, gestural or otherwise. In short, to cross over from {E2} to {E3} is to enter an entirely new territory; one now characterized by the mysterious, vague, or undefined.

Thus, structurally, Braxton combines concatenative and simultaneous approaches to hybridity. As described above, Braxton himself firmly delineates what he considers "fixed" and "open" sub-modules: disjunct performance "zones" which loosely trace the way he opts to concatenate denotative and connotative notation. When performer-mapped symbols occur, they are typically gated-off by hard transitions; jump-cuts from one performance paradigm to another. Given that Braxton conceives of *No. 76* on the whole as "a static 'dribble' of isolated events that come together and apart," this concatenative approach reinforces the development-less, arc-less approach the composer sought for the piece.[52]

The matter is complicated, though, by Braxton's willingness to allow color (again, only semi-defined depending on what material the performer considers "the text" of the work) to spill over into "fixed" sub-modules. Here, well-defined material comprising modified traditional notation is subject to modulation via fundamentally obscure variables—a textbook case of simultaneous hybridity. Similarly, within "open" sub-modules, staff fragments bearing denotative content in the form of short, clefless melodies are modified by both color and some undefined position in virtual three-dimensional space. Again, coincident denotative and connotative notations require that a performer simultaneously engage in conventional reading as well as mapping when engaging with these fragments.

To sum up: Though Braxton's use of the terms "fixed" and "open" differs considerably from common musical parlance, it is clear that he takes this division seriously. To the extent that he incorporates less-defined or undefined glyphs into *No. 76*, he seems to do so according to a consistent logic corresponding to this binary distinction. Though color, shape, three-dimensionality, and (undefined) numeric code all require a considerable degree of performer-mapping in order to materially impact musical performance, Braxton opts to allow

52. Braxton, *Comp. Notes D*, 148.

only color (the modifier closest to a form of traditional notation—namely, expressive text) to cross over into "fixed" material. The other elements are reserved exclusively for "open" sub-modules which are always (for a given player) cleanly separated spatially and temporally from material which is to be "read." Nevertheless—hybridity in both its forms is a constant presence in the work; implying that mandating the performer's dual act of reading/mapping forms a critical component of the "expanded functional and meta-functional arena" which *No. 76* creates.

Hybridity in *Das Andere*/Op. 89

As discussed in Section 2, undefined graphic elements(/attributes) do play a role in *Das Andere*/Op. 89. However, unlike what we see in Braxton's work, Rădulescu employs a denotative/connotative hybridity which is largely the result of a single notational structure: his use of text.

Throughout this chapter I've conceptually linked Rădulescu's two works on account of their many shared notational elements and their single, unifying compositional ethos (the creation of *sound plasma*), referring to both of them as a single work complex. However, if examined specifically through the lens of notational hybridity, the two works begin to look profoundly different. Barring concrete indications of playing technique or brief clarifications of unfamiliar notation (*G-*, *D-*, or *E-spectrum*; *subito* Σ; $\pm$ *capo tasto*), expressive text of any sort is conspicuously absent from *Das Andere*. Even within the three included pages of instructions, text is not used as a means to psychologically motivate performance, but as a highly-detailed, rather dry encyclopedia of the bespoke techniques his notation encodes. To anyone familiar with Rădulescu's quite colorful prose this might come as a surprise, especially given that well-integrated poetic text had already been a feature of his musical work for a number of years. After all, one of Rădulescu's first formal attempts at "plasmatic" music, *Capricorn's Nostalgic Crickets* (1974, for seven identical woodwind instruments) asked performers to

consider its embedded poetry "through to its depth" before and during performance.[53]

It seems that the intent behind *Das Andere*'s conspicuous lack of poetry was the creation a sort of psychic *tabula rasa*—one which allowed the piece's plasmic products to speak for themselves without the burden of being filtered through the performer's mapping scheme. In other words, *Das Andere*'s radically unconventional notation and its consistent use of "micro-improvisation" belies the fact that the piece hews startlingly close to the traditional "reproductive" or "interpretational" paradigm of Western art music literacy. This is, of course, not at all the case in the later work. Not content to deploy Lao Tzu's words as mere decoration or as "simple" expressive text, Rădulescu instead opts to amplify this distinctive element by rendering it in an enormous unconventional typeface; drawing the eye immediately even among dozens of novel glyphs. Where traditional expressive text might be selectively ignored or "re-written" to suit the demands of performance, Op. 89's text proscribes this freedom by graphically insisting upon its own relevance. The importance of text is doubly emphasized by the presence of the three-axis interpretation scheme discussed earlier. According to the rubric, text simultaneously serves both a denotative (rhythmic) and connotative (ritual) function. In this sense, if Braxton's work is characterized primarily by cellular, disjunct, concatenative notational hybridity, then Op. 89 is instead characterized by a radical unity of denotative and connotative elements—i.e. of simultaneous hybridity. There is, in essence, no corner of the score which is exempt from the influence of these undefined ritual elements. From beginning to end, the player must somehow contend with the {magic, symbolic **writing**, IMAGE} axis of interpretation all the while negotiating precisely-defined improvisatory tablature.

William Dougherty's study of Op. 89, almost certainly its most comprehensive treatment, notes the relative (visual) prominence and structural importance of text in the work. In describing its function, though, he asserts that the text's "magic" or ritual value is entirely bound up in its rhythmic function—that these phonetic rhythms alone might "transport the performer into a special state of awareness."[54] In other words, under this view, executing the

53. Marinescu, "Horațiu Rădulescu," 9.
54. Dougherty, "On Horatiu Radulescu's 5th String Quartet," 37.

various 𝔸 and Σ gestures synchronized to phonetic rhythms itself satisfies all three axes of Rădulescu's three-dimensional rubric (Fig. 3.9). I would find this argument more convincing if the relationship between the text's phonetic rhythm (which is, after all, hardly obscure and easily identifiable) and the precise musical materials onto which it might conceivably map were more clear. If these rhythms themselves served as the primary ritual catalyst, I would expect their execution to be wholly unambiguous, if complex (as is the case for nearly all the rest of Op. 89's notation!). As it stands, though, Rădulescu purposefully leaves this relationship vague—precisely defining neither the phoneme/gesture interaction nor the full interpretive boundaries of the text-qua-text.

Instead, I would put forward that rhythmic interpretation of the text only fulfills one of these interpretive axes. In truth, the composer's intended holistic approach relies on multiply realizing these texts—partly (when possible) as concrete, denotative rhythmic elements, partly as gnostic expressive text onto which performers must project their own meaning. Only via this simultaneous reading/mapping—honoring both the {rhythm} and {magic} axes through notational hybridity—can the performer attain this desired "awareness." *Das Andere*, entirely lacking (this particular) ritual dimension in its notation, suddenly looks like a very different piece; as though prior to the full flowering of his notation scheme Rădulescu needed to explore the possibilities of a single interpretive axis ({notational communication}?). The addition of connotative/denotative hybridity via ritual text (entirely lacking in *Das Andere*) in the decade separating the two works amounted to an entirely new "three-dimensionalization" of the notation scheme.

Graphicality—i.e. notation's visual design language—is clearly an important consideration in Rădulescu's compositional methodology. Simply put, as can be seen in the many examples provided above, *Das Andere* and Op. 89 demonstrate deliberate design choices which result in a very distinct, idiosyncratic notational aesthetic. These graphic parameters do not rise to the level of "symbols" insofar as they were not deployed to calculatedly impact performance in the same way as the many examples of neonotation which appear in the score. Nevertheless,

the notation's graphic "surface" could be considered so striking—so alien that its graphicality might well bleed into performance practice in any case; impacting the music even outside of the nominally defined framework. The closest familiar parallel is probably the golden-era "maximalist" work of Brian Ferneyhough; a composer whose penchant for dense, thorny notation is (for better or worse) probably better known than the actual sonic trace of his music. Figure 3.16, excerpted from *Unity Capsule* (1976) for unaccompanied flute, demonstrates typical Ferneyhoughian notation-density over a single $\frac{2}{8}$ bar.

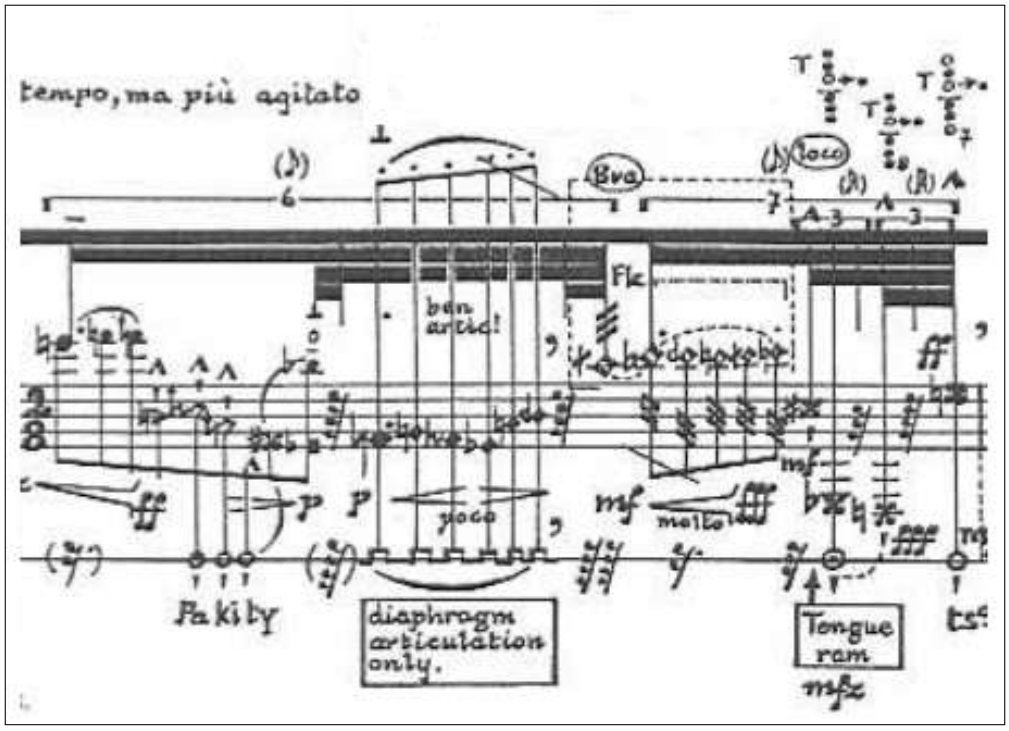


Figure 3.16: Excerpt from Ferneyhough's *Unity Capsule* demonstrating excess graphicality (pg. 14, sys. 3).[55]

Every symbol Ferneyhough uses is well-defined either by convention (in the context of late-century art music) or by the composer himself—performer-mapped "graphic notation" as such does not occur in his work. That is to say: a sufficiently well-programmed computer could output a meaningful rendering of each symbol precisely as it appears. However, a crucial component of Ferneyhough's work is the way that the system of notation necessarily

55. Brian Ferneyhough, *Unity Capsule* (Edition Peters, 1976).

interacts with the human element. At first glance it might seem that every conceivable aspect of performance has been parametrized and shaped by the composer's hand, thereby nullifying any creative liberties on the part of the performer. The truth, however, is that this "information overload" is a deliberate tack Ferneyhough takes to bring a measure of creative indeterminacy back into his work. In a mock-interview published in his *Collected Writings* (1995), he asserts:

> [N]otation is always relative to intention, whereby it is up to the composer to adequately suggest appropriate forms of response. [...] Given the lack of externally given criteria (historical, cultural) the composer surely has the responsibility to reflect upon such problems and to come up with forms of notation and degrees of physical involvement on the part of the performer which would begin to suggest (and then stop!) possible avenues of fruitful approach to the text. [...] One chooses degrees and emphases of notational precision with the intention of suggesting appropriate interpretational approaches to the text at hand, not with the aim of eliminating performer autonomy. Quite the opposite![56]

Stuart Paul Duncan, in an article on Ferneyhough's notational practice clarifies:

> [...] Ferneyhough's music presents a map, incorporating a variety of paths in which the performer, instead of the composer, becomes the musical filter to [...] the "world." In other words, the complexity of Ferneyhough's music derives not from the informational density of the score [...] —it is not that the litany of performative instructions, upon successful completion, transparently transmits the composer's prebuilt compositional system to the listener—but rather from a coalescence of the dialogues between composer and score, score and performance, and performance and reception.[57]

For Duncan, Ferneyhough's notation, through its sheer density, achieves an affective graphicality which itself mediates operant composer/performer and performer/score relationships. This is accomplished by, in effect, presenting so much data that the performer has no choice but to actively filter out parameters which seem, at time of rehearsal or performance, to be less relevant than others. Ultimately, given that this filtering process is not directly guided by the composer's creative decision-making but the performer's, it constitutes a particular sort of performer-mapped openness.

56. Brian Ferneyhough, *Collected Writings* (Harwood Academic Publishers, 1995), 70–1, ISBN: 978-3-7186-5576-2.

57. Stuart Paul Duncan, "Re-Complexifying the Function(s) of Notation in the Music of Brian Ferneyhough and the "New Complexity"," *Perspectives of New Music* 48, no. 1 (2010): 138–9, ISSN: 0031-6016.

I take it that while he never quite matches Ferneyhough's ink-per-square-inch, the same process is at play in Rădulescu's work as well. Braxton's neo-notation is, for all its novelty, fairly comprehensible once the boundaries of play are known. Its consistency, modularity and self-pacing grant the player enough mental real-estate to both read and re-map in real time without overtaxing their creative faculties. To contrast, Rădulescu's (particularly in Op. 89) often changes drastically from page to page. Micro-improvisational inducements will appear in multiple forms, either with specific modifiers or without. Often the page will become cluttered with arrows, ties and slurs, tiny or extremely large instructions in differing scripts, branching paths, clarifications of clarifications, etc. Where Ferneyhough's notation was painstakingly engraved (each note copied with a calligraphic pen or hand-rubbed from the beautiful—now sadly extinct—Notaset dry-transfer paper), Rădulescu's spindly copy-style seems itself wild and improvisatory—commensurate with the rapid-fire shifting between playing techniques. Compounded by the complexity of the aformentioned text, all of these factors combine to yield a dense network of material; never literally *impossibly* dense, but intricate at least to the extent that precise constraints over the performer's potential action must be mapped, in part, by the performers themselves.

3.2.2 How does (open) notation serve the artist?

The above analysis shows how two very different composers, armed with sophisticated, bespoke neo-notation schemata, achieve familial but quite distinct performance environments, ultimately serving very different compositional goals. In this section, I would like to briefly assess the ways in which the structure of these schemata are able to support these goals and how two types of (what might broadly be considered) "open notation" are able to achieve radically distinct—in some ways even antithetical—effects.

To grossly oversimplify a complex topic: We might reduce the driving force behind Rădulescu's oeuvre to the creation, by various means, of a single sonic-ritual phenomenon—*sound plasma*. *Das Andere* and Op. 89 are by no means the only two works to achieve this

goal. Rather, they represent a local point of refinement of Rădulescu's process; a point at which the composer had developed an entire bespoke notation scheme for efficient *sound plasma* production. Roger Heaton describes this mysterious *sound plasma* in an article from 1983 (note: the year prior to *Das Andere*'s premiere).

> Radulescu's works are built from sound situations created by different treatments of fundamentals, the spectra produced by these treatments, and the isolation of individual spectra. The music results 'naturally' from the initial organisation of sound sources and formal structures, its interest lying in the interaction of the resulting harmonics, difference tones, subtones, rhythmic beats, and so on. The texture thus produced is called the 'sound plasma';
>
> > there are no longer steps, interval jumps, chords etc., but discreetly gliding and trembling narrow frequency bands, vibrating (living) sound plasma. [...] Hence, rhythm exists no longer as combined values, but only as spectrum pulse of the micro and macro sound plasma [...][58]
>
> To put it simply, the ways in which the global sound sources are treated must follow certain 'compositional' laws if their product is to fuse together and achieve 'the sound micro and macro plasma, as the real music of the future'.[59]

Though neither *Das Andere* or Op. 89 mention the term explicitly, the phenomenon Heaton describes fits their resultant sound-worlds perfectly. What Rădulescu does give us is a rather enigmatic description of his goals in particular with *Das Andere*:

> This music, at the border between score and sound phenomenon, is trying to create a state of trance, close to a spiritism seance where we would invoke our own *alter ego* or *anti-I*. The sole subconscious "register incline" might render conceivable the advent of that psycho-acoustical phantom due to the continuous spectral enrichment of the instrument in its low.[60]

Thus, we might assume, Rădulescu designed *Das Andere*'s notation so as to bring about *sound plasma*'s sonic and ritual properties as efficiently as possible given the instruments (and instrumentalists) with whom he intended to work. Ritual considerations, after all, must still abide by real-world pressures such as rehearsal time, musician hourly rates, etc. As such, he has taken string-specific gestural parameters (bow speed, bow pressure, bow position, left hand placement and rate of movement) and clustered them together into mutable, flexible

58. Horațiu Rădulescu, *Sound Plasma: Music of the Future Sign* (Munich: Edition Modern, 1975).
59. Roger Heaton, "Horatiu Radulescu, "Sound Plasma"," *Contact* 26 (1983): 23–4, ISSN: 0308-5066.
60. Rădulescu, *Das Andere*, dedication page.

second-order symbols (𝔸, Σ, etc.) which, through the use of a number of modifiers, finely regulate the performers' micro-improvisatory movements. This, in turn, allows the performer to quickly grasp the otherwise devilishly complex "body data" needed to produce *sound plasma* to Rădulescu's satisfaction.

Here the composer has solved two problems at once: (1) Where users of neo-notation are often faced with the prospect of memorizing the function of dozens of new symbols; in effect forcibly reconfiguring their entire network of notational affordances, Rădulescu has deployed comparatively few new symbols and has taken care to organize them logically according to function. In addition, several of these symbols replicate functions already present in traditional notation; further diminishing the learning curve for their adoption. (2) By making each of these second-order symbols flexibly modifiable by common-sense parameters (the positions of natural harmonics accompanying Σ gestures, for instance), he has ensured that these symbols gestural domains—i.e. the fields of potential they afford players—are sufficiently detailed, with a high degree of variability. That is to say: one symbol, properly configured, might result in an entire galaxy of sounds. *Das Andere*'s notation, in short, was developed primarily because it was the most straightforward means of achieving this difficult, arcane sound-world; side-stepping the need for walls of explanatory or expressive text or a dense jungle of 32nd-note figures which would never succeed in capturing the "emergent" properties of *sound plasma* anyway. As it happens, the quickest way to this goal is the direct manipulation of the body—a notational action-map comprising bodily processes rather than sonic events.

We understand what Martin Suckling means when he describes Rădulescu's notational practice as requiring "near-continuous improvisation" and "open[ing] a door [to] the performer's creativity."[61] Certainly there is an extent to which the performer's "creative" rather than "reproductive" faculties must be engaged when performing this music. For instance, the precise contour of the harmonic melody performed in Σ modules is up to the whim of the

61. Suckling, "Rădulescu: The Other Spectralist," 2.

player—as are "the direction of the arpeggios [...], the speed of their deployment, and the point of contact along the strings" in the 𝔸 modules.[62] However, closer inspection reveals that collaborative interplay (perhaps the first thing we think of when encountering the term "improvisation") is in fact the furthest thing from Rădulescu's mind. Rather, this notation marks an attempt to radically decouple the performer from his/her creative faculties by engaging precise, raw body-data rather than more traditional or more open, improvisational forms of notation—"[forcing] performers to think differently than they do when playing conventional music, ensuring a fresh interpretation that is fee of many preconceived parameters of traditional playing technique."[63] This is an open notation which renders the player's years- or decades-old muscle memory and cognitive maps obsolete, and which acts not as a call to create, but as a detailed (albeit indeterminate) instruction manual for the creation of *sound plasma.*

By this point it will have become clear that in some ways, Braxton's and Rădulescu's systems (and motivating ideologies) bear more than just a passing resemblance. Both are artists wholly oriented toward creating music for the future—music which by its very structure points the way forward for all manner of artistry and for society as a whole. Various denotative and connotative forms of notation and their attendant fixity traversal and hybridity represent important tools in both composers' arsenals with which they intend to bring about their world-transforming artworks. Both artists work (to use the eternal present tense) in dogged pursuit of certain musical ideals which they envision lasting long after their own passing.

However, where Rădulescu seeks, through notation, to take direct control of the performer's bodily gestures in service of a divine, gnostic sound-world, Braxton takes a very different approach. For one, Braxton employs a much larger library of symbols, which tend to focus not on entabulating the parameters of the body, but on invoking improvisatory utterances featuring varying constraints. Braxton's approach to notation in *No. 76* is not that of an artist with a unified notion of a particular sound-world seeking the most efficient instruction

62. Rădulescu, *Das Andere*, Instruction pg. 3.
63. Dougherty, "On Horatiu Radulescu's 5th String Quartet."

set to bring it about. Rather, Braxton orients his composition around a sophisticated *process* which acts as a musico-philosophical beacon toward future art-making; one which necessarily draws in many distinct aspects of human creativity.

To return to a topic glossed in the last section: In his 1985 philosophical *magnum opus* the *Tri-Axium Writings*, Braxton himself broadly addressed what he took to be critical distinctions between Euro- and Afrological orientations toward musical notation.

> The use of notation in creative improvised music has yet to be really examined in all its different permutations. For the reality of this consideration functions on several levels which are outside of European art music. Notation as practiced in black improvised creativity is not viewed as a factor that only involves the duplication of a given piece of music - and as such an end in itself. Rather this consideration has been utilized as both a recall-factor as well as a generating factor to establish improvisational coordinates. In this context notation is utilized as a ritual consideration and this difference is important for establishing the reality platform of the music - dictating the harmonic and rhythmic sound-path of activity and also as a center [sic?] factor.[64]

In other words, notation in the Black improvised music tradition functions less as a means of bringing about an idealized, museum-grade reproduction of an honored work of art, and more as a device to aid in musical "recall" and "generation." A piece of music by a great tune-writer which is subsequently transcribed into lead-sheet format is a vehicle for creativity; the use of which constitutes a type of musical ritual. He continues:

> For to experience the music of any creative orchestra is to see the re-shifting of structural and vibrational moment-events [...] as a means to have the fixed-activity of a given composition re-ordered to deal (or apply) with the physical universe particulars of its performance. Today the use of re-ordering in this manner is called alienatory [sic] or indeterminism - but this practice has been utilized in creative music from the black aesthetic since its inception. Notation in this context invariably becomes a stabilizing factor that functions with the total scheme of the music rather than a dominant factor at the expense of the music. [...]
>
> The fact is - western art music has come to only utilize its functionalism with respect to the dynamics of re-interpretation [...] and in no way does the dynamics of interpretation compare of [sic] the freedom inherent in the functional arena of creative black music.[65]

For Braxton, notation which brings about indeterminate gesture or sound is part and parcel of

64. Anthony Braxton, *Tri-Axium Writings*, vol. 3 (Oakland, CA: Frog Peak Music, 1985), 35.
65. Ibid., 35–7.

the Black improvisatory project in that it has always served as a "stabilizing factor," lending a measure of permanence to necessarily ephemeral improvised works—its "rediscovery" and renaming by European or New-York-School composers in the 1950s is immaterial. However, Braxton's own project was always more ambitious than would be allowed by a single Afro- or Eurological musical vantage point. Traditional notation as wielded by the great mid-century improvisers by itself would prove insufficient to bring about Braxton's real goals: the establishment of a truly trans-idiomatic form of music-making. Per Braxton's explicit "mission statement" given in the *Composition Notes*:

> [...] this composition was not designed to adhere to either the current misconceptions surrounding the word 'jazz' (with respect to how the science of that thrust is viewed, or so-called viewed - in this time zone) nor can this work be defined in 'western art music' terms. Rather the meta and empirical foundation of this work was conceived with respect to the spiritual and composite vibrationatory affinity-area of world culture.[66]

It is only fitting, then, that this "composite" music-making paradigm reveal itself to its participants via a similarly composite notation system. Braxton's scheme, in its "fixed" sub-modules, draws in the flexible fixity of "Afrological" lead-sheet performance. Melodies presented here are "fixed" in the same sense that a standard's melody is fixed in jazz performance; that is, in such a way that it might undergo creative transformation all the while retaining some persistent, recognizable identity in each of its realizations. However, Braxton clearly borrows, in equal measure, modes of play which originated with American and/or European scored open musics. "Collage-able," order-agnostic musical modules (both at the macro- and micro-scale) clearly hearken back to the early experiments with open notation which Eco identified in *The Open Work*; Stockhausen's *Klavierstück XI*, for instance, which represented an early example of modular notation organized according to the performer's whim.[67] Likewise, his experiments with alternative clefs reflect notations which prioritize melodic contour over specific pitch set (as in Andriessen's *Workers Union* (1975) from a few years prior). Critically, certain elements appear *sui generis* where no suitable subsystem

66. Braxton, *Comp. Notes D*, 136–7.
67. Eco and Robey, *The Open Work*, 1.

existed from which to borrow. Braxton needed bite-sized improvisatory "outbursts," but ones which might be modulated, filtered, rendered contingent at a moment's notice. While many solutions existed, Braxton opted to incorporate color, shape, numeric code, and three-dimensionality; all factors which were already present to one degree or another in his long-running creative metasystem.

Instead of beginning with a complex imagined sound-world and carefully selecting the most economical notation scheme to bring it about, Braxton in effect "composes" a finely-tuned system (via what I've called a *process-concept*) comprising various forms of musical literacy, interactivity, creative constraint, "emotional subjective interpretation," etc., in order to ultimately bring about his desired third-millennium form of Ur-creativity. While his notation frequently constrains performers' sonic outputs via the usual means (choice of instrument, melodic contour, rhythmic parameters, etc.), the creative process is the real locus of Braxton's composerly intent. Figure 3.17 compares Braxton's and Rădulescu's observed relationships to notation in a chart indicating the "flow" of influence through each composer's scheme.

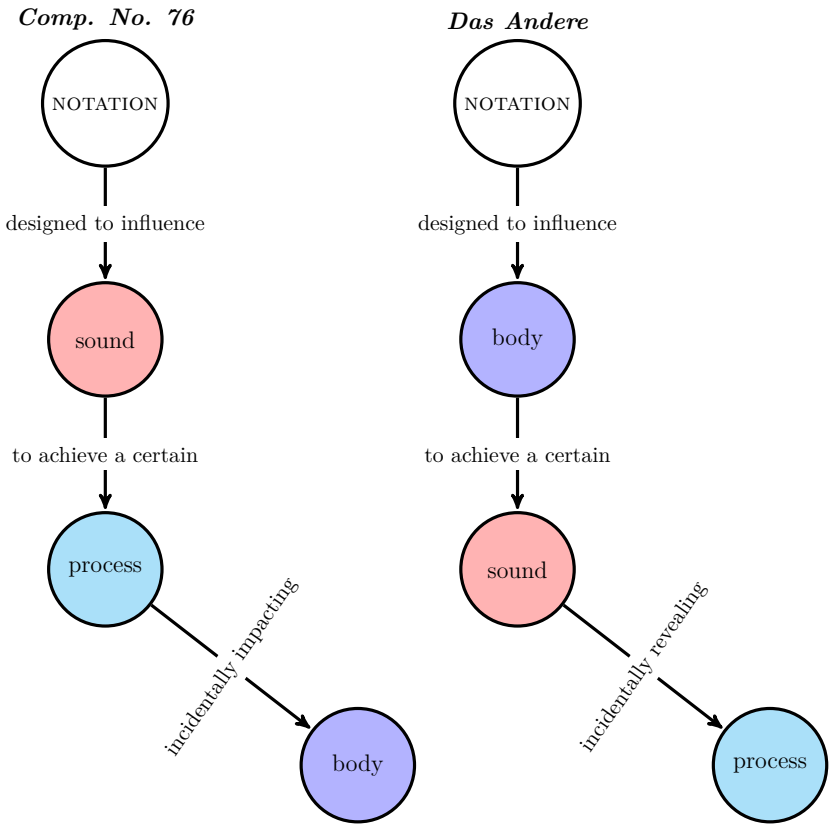


Figure 3.17: Illustration of influence "flow" through *Composition No. 76* and *Das Andere*

Of course, Rădulescu complicates this reading by expanding *Das Andere*'s notation scheme to encompass a distinctly Braxtonian "subjective interpretation" during the construction of Op. 89. *Das Andere*, written nine years prior, had already put forward a more-or-less complete vehicle for the creation of *sound plasma* even without provisions for performer-mapped notational semantic content. Though the factors which transmuted body-data into "precisely imprecise" sound remained essentially unchanged between the two works, Rădulescu saw fit to expand the ritual function of the music—taking it from a mere downstream effect of the sound to an inseparable aspect of the act of performance itself. At this point it becomes particularly difficult to ignore the extent to which Rădulescu's three-axis interpretation rubric (Fig. 3.9) echoes Braxton's now-venerable Tri-Axial philosophy (for which his philosophical

tract was named) which suffuses all aspects of his creative expression.[68]

While the existence of a direct lineage between the two conceptual frameworks is unlikely, it seems noteworthy (to say the least!) that Rădulescu's effort to create new forms of notation (intended specifically to represent the music's ritual considerations) manifested itself in a three-dimensional structure directly homologous to Braxton's own tri-axial artwork-interpretation (etc.) scheme. In expanding *Das Andere*'s notation to include Lao Tzu's sacred/secular text as well as an appropriate set of tools to bring it to bear on Op. 89's sonic materials, Rădulescu integrates multi-layered structures of denotative/connotative notational hybridity in much the same way Braxton had nearly two decades prior. Rather than interpret this change as a sudden realignment of Rădulescu's musical priorities, we might read the "three-dimensionalization" of the *Das Andere* system not as a means of replacing but of *reemphasizing* the music's spiritual component; an aspect already present but in danger of being lost if the work was only ever a series of micro-improvisatory physical gestures and the whirling, buzzing sound-world they produced. Rădulescu's music never sought to reach the same diversity of macro- and micro-level improvisatory play-environments that Braxton created in *No. 76*. In deploying his unique mode of simultaneous hybridity, however, Rădulescu was able to, at least fractionally, allow his performers to play a collaborative role in ascertaining the shape and color of the *sound plasma* ritual.

68. Unfortunately, this work lacks the space for a full (or even modest) rendering of the central tenets of Braxton's Tri-Axial philosophy. For now it must suffice to explain that Braxton conceives of his work as drawing together many crucial sets-of-threes: *mutable*, *stable*, and *correspondence* logics (traditional improvisation, extant works, open works); ritual and performance logics of the past, present, and future; the *primary*, *secondary*, and *tertiary* material of Ghost Trance Music; the three levels of inquiry used to construct the *Tri-Axium Writings* (which are, of course, separate from the three central *goals* of the *T-AW*: *affinity postulation*, *axium correlation*, and *reality imposition*). — For more information, please see Braxton, *Tri-Axium Writings*; Cauwenberghe, "A ritual of openness"; *SA16: The Anthony Braxton Issue*; Lock, *Forces in Motion*; Lock, *Blutopia*, 167–75; Lock, "'What I Call a Sound'"

3.3 Conclusion

Prima facie, the two compositional paradigms elaborated over the past fifty or so pages seem fairly similar. Both artists begin with essentially the same sorts of raw materials:

- a foundation in traditional notation;
- a need to create a particular sort of indeterminate sound-world;
- a system of "graphic" open notation featuring...
  - well-defined elements for inducing action and modifying that action and
  - more vaguely-defined or un-defined elements requiring performer-mapping to function;
- and a notational syntax which contextualizes these elements and allows their spatio-temporal deployment.

Further, both artists blend traditional and bespoke notations; making for a playing experience in which musicians must balance traditional notions of recitation with active creative decision-making through forms of improvisation. Readily apparent, however, to anyone with even a passing knowledge of these artists is that their compositional processes, their musical products, and their attendant philosophical frameworks differ wildly. The paradox articulated by this distinction—namely "How do two work complexes, both nominally neo-notational and improvisatory, wind up so vastly different?"—is one I hoped to begin answering in this chapter. Specifically, it has been my contention that more subtlety exists in the ways novel systems of notation are constructed and used than is typically addressed in scholarly literature. Deeper understanding of the ways that notation serves to mediate performance (and performer/composer agencies) demands a more thorough mode of interrogation—not only of general properties of notation systems (as we found in Ligeti's novel typology last chapter), but of the specific ways that new notations are lent meaning in the context of a musical work.

Braxton and Rădulescu strike me as two of our most fascinating systems-developers. Throughout their respective catalogues (though perhaps especially in the works mentioned here), both demonstrate dogged pursuit of (truly) radical musical ideals and both share an expertise in the way notation can be used to bring these ideals to bear for both performer and

listener. I hope that this chapter has served not only as a justification for my admiration of these artists' working methods, but also as an elucidation of the ways notation's fundamental particles can dramatically influence compositional systems. I contend that only through a greater understanding of notation's general operating principles—e.g. through efforts like Ligeti's novel notation typology established last chapter—as well as close examination of these notational quanta, that we might more fully come to terms with notation's power and influence over the way we write and perform music.

CHAPTER 4

{O-G}

This final chapter is intended to describe in some detail the compositional fruits borne of my time spent investigating novel systems of notation. During this project, work always proceeded on two fronts simultaneously: scholarly and creative efforts. As I began developing more robust notions of the syntactic and semantic structure of (open) notations found "in the wild," I increasingly became aware of the subtle but powerful ability of new notations to mediate performance in ways typically closed off to traditional methodologies. As such, I began work on a rather humble framework oriented specifically toward corralling improvising musicians' musical expression with varying degrees of constraint; the ultimate goal being a robust and entirely well-defined scheme with which to play-test structures of fixity-traversal in real time. These creative efforts would culminate in a "capstone" concert of original works for a variety of ensembles; each work employing this novel notation scheme in one form or another. Thus, this chapter documents my experiences as a composer-cum-system-developer, beginning with my initial motivations and design concepts, continuing on to details pertaining to the actual structure of the system, and ending with a description and assessment of the capstone works followed by a final reflection evaluating the system's efficacy and future.

4.1 Motivations and conception

4.1.1 Formative experiences with open notation schemes

Over my two years' time in the performance and literature MFA at Mills College (and during my tenure in Oakland thereafter), I was, on many occasions, called to perform by my colleagues and visiting composers. As I was known to be a musician nominally specializing in improvisation, the scores for which I was tapped almost without exception involved some degree of open notation in addition to traditionally-notated material. Given the diversity of composerly voices in the program, this openness took many different forms ranging from flexible, stripped-down traditional notation (à la Berio's *Sequenza I* (1958) to text scores (à la

Stockhausen's *Aus den Sieben Tagen* (1968) or any number of Pauline Oliveros' works from the 1970s–1980s) to, of course, every conceivable type of "graphic notation." The demands placed on these open notations and the goals they were intended to achieve also varied considerably. Composers I worked with sought free-floating Cagean "aleatory," or the shifting densities of Lutosławskian "stochasticism," or the virtuosity of some kind of post-post-bop "open improvisation;" each of which seemed to mandate an appropriate graphic trace distinct from our traditional *lingua franca*. Very occasionally, the composer's sound- or process-concept for these open materials would be clear, well-communicated, and artfully and efficiently notated, making for fruitful and relatively painless rehearsals. Far more often, however, these sections (which, to be clear, formed the work's creative core and *raison d'être*) would prove to be intractably difficult to get right, requiring hours of rehearsal, endless composer/performer back-and-forth and, in the worst of times, eleventh-hour rewrites to remove or "fix" (literally) the offending material.

Unfortunately, the extent to which a score was aesthetically interesting or visually expressive seemed inversely correlated with its ability to be successfully "decoded" and interpreted. In fact, "decoded" is a bit of a misnomer in that new glyphs, where they appeared, would be deployed intuitively; inconsistently—more according to aesthetic principles than musical or conceptual ones. Simply put, in the large majority of cases there was no encoding mechanism in play at all. A series of black dots on a blank field might serve as rather precise rhythmically-proportional notation invoking a precisely-calculated number of pitchless chirps; or, alternately, it might stand in for ametric staccato improvisation within a particular mode. Without a protracted impromptu Q-and-A session with the composer, it was wholly unclear which s/he meant. Problems, naturally, increased in severity as ensemble sizes increased. In the end these experiences became so much the norm that I began to view these notational experiments—especially the "graphic" ones—as a lost cause; techniques best replaced by

judicious use of explanatory text.[1]

4.1.2 Something better

Thankfully, while these lackluster firsthand impressions pushed me away from open scoring, I was fortunate enough to be pulled back in, obliquely, by a number of important influences.

Roscoe Mitchell

Though I had always been particularly drawn to scores as art-objects and had dabbled to a degree with alternative notations, my time at Mills ultimately resulted in access and exposure to many more compositional paradigms than had been available to me prior. In particular, Roscoe Mitchell's composition lessons and group improvisation-sessions proved most valuable in this regard.[2] Prof. Mitchell's music had been an important factor in my decision to apply at Mills; since I became aware of his work, I had always been drawn not only to his acute blending of the cerebral and the brute, but also to the constant tension his work seemed to exhibit between clearly improvised material and material which could only have been orchestrated pre-performance. Though I did not know it at the time, Mitchell had developed (among other techniques) a number of simple but sophisticated ways of working with notation that facilitated this blend of fixed/open materials.

Ultimately, my composition lessons granted me rare access to a number of Mitchell's unpublished scores; allowing me to come to grips with some of the ways this was accomplished over the years. Figure 4.1 illustrates an excerpt from one such score: *L-R-G*; a trio for multi-instrumentalists originally written for Mitchell, Wadada Leo Smith, and George Lewis

1. This is, of course, not to paint every Millsian scored improvisation as irredeemably dire. A number of performances (particularly for small groups whose musicians already enjoyed a degree of familiarity) actually turned out quite well. Where successful rehearsals/performances did occur, however, they tended to be the function of generally pleasant and communicative composers—not said composers' notation design acumen.

2. Lamentably, despite my abiding appreciation for Mitchell's works (both as bandleader/composer and with the Art Ensemble of Chicago) I lacked the space in Chapter Three to expand my discussion to these pieces. Mitchell's subtle, highly personal relationship to notation absolutely merits a detailed investigation of its own.

in 1978.

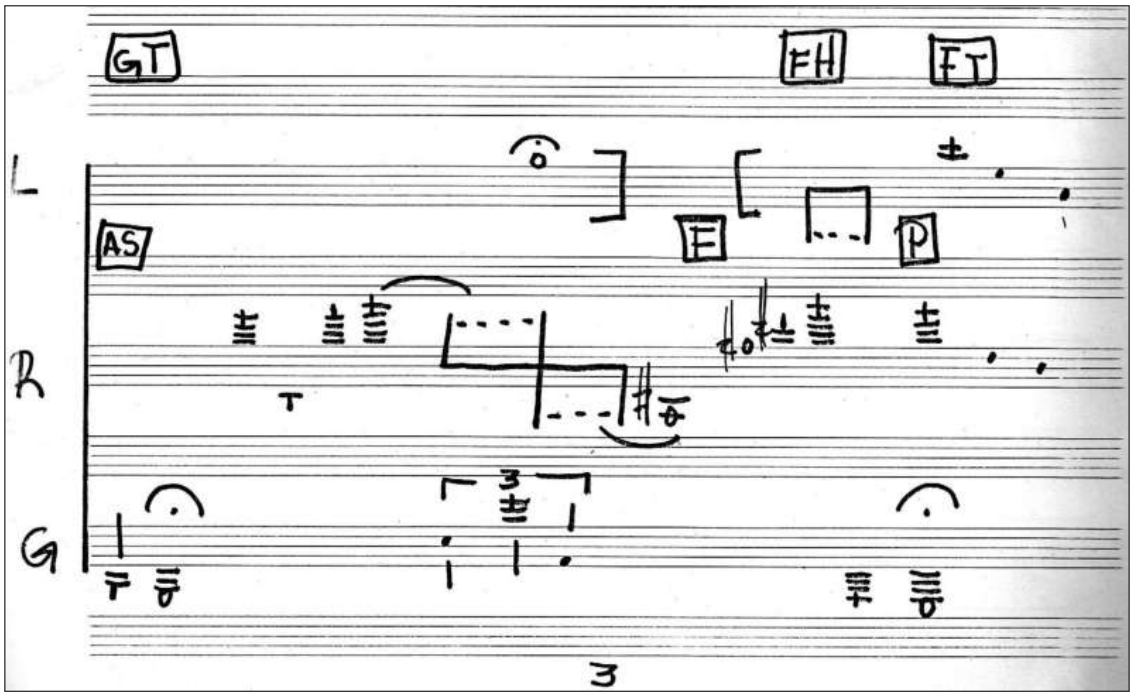


Figure 4.1: Excerpt from Roscoe Mitchell's *L-R-G* (1978) (pg. 3, sys. 2) demonstrating simple, effective constraint over players' improvised gestures.

L-R-G represents a particularly seamless integration of familiar notation with improvisatory inducements of various types. When traditional notation appears, it is, in a sense, distilled to its (pitch + rhythm) essence—much in the same way as one might see in a typical lead sheet. It's clear from the outset that this is a system designed for the creative musician. Where improvisation is called for, it is induced by simple, bracketed portions of the staff—encompassing either the entire staff (as in Smith's first statement in Fig. 4.1) or only part of it (Mitchell's gesture following the first four notes). Changes of instrument are called for (often in rapid succession) via capital-letter glyphs above the staff (*A*lto *S*ax, *F*lute, *P*ercussion for Mitchell here). Simple rules apply which render the fixed/open gradient transparent; facilitating not only reading but interacting *via* reading. Mitchell demonstrated that meaningful improvisatory interaction could be scored—mediated—via graphic elements while still keeping interpretive ambiguity to a minimum. Indeterminate sound- or process-

concepts could be encoded which were nevertheless concretely-defined and well-communicated. *L-R-G*, along with its contemporary "cousins" *The Maze* and *S-II Examples* (which all appeared together on Mitchell's 1978 album concatenating the compositions' names) served, in a way, to indict the precious, over-wrought, but ultimately less-than-useful scores I'd experienced prior.[3] The crucial difference seemed to be that the score itself served to establish clear rules constraining play; rules which, to be sure, were always fair game to break if need be, but which provided players a default set of parameters clearly communicating the composer's compositional aims.

Anthony Braxton

Likewise, though I was already a card-carrying Anthony Braxton devotee by the time I arrived at Mills, my time with Prof. James Fei (a long-time multi-wind player and Braxton collaborator) exposed me to far more—and more pertinent examples—of Braxton's music, as well as a greater understanding of his sometimes rather opaque working methods. Perhaps paradoxically, the most impactful of these systems was (and remains) Braxton's "Language Music" system. Generally, where the Language Musics are cited they appear as a list of twelve glyphs and the gestural families they represent (see Fig. 4.2).

3. Roscoe Mitchell, *L-R-G / The Maze / S II Examples*, Vinyl, 1978.

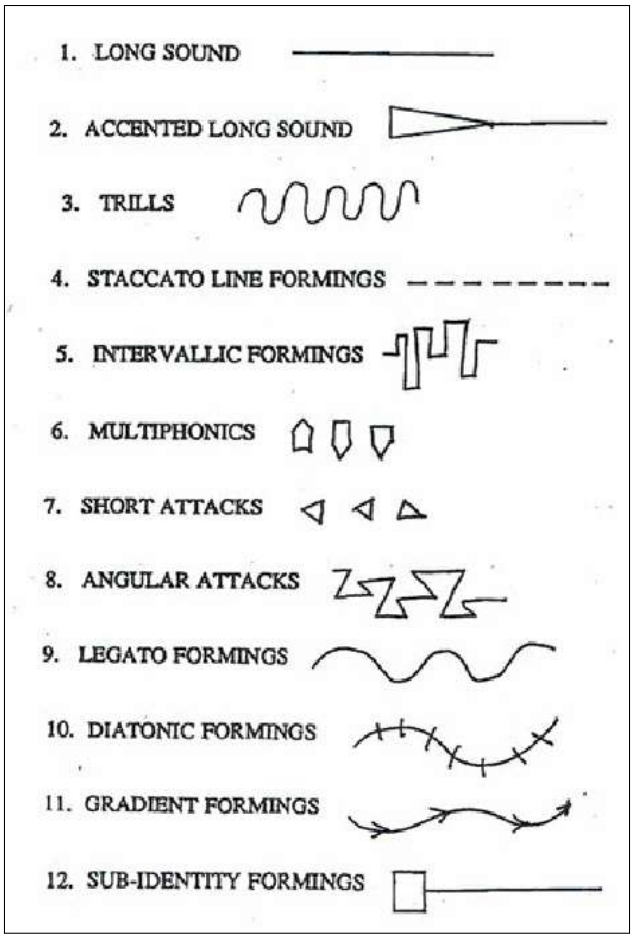


Figure 4.2: Anthony Braxton's twelve "language types" which inform (among other things) his works for unaccompanied alto saxophone.[4]

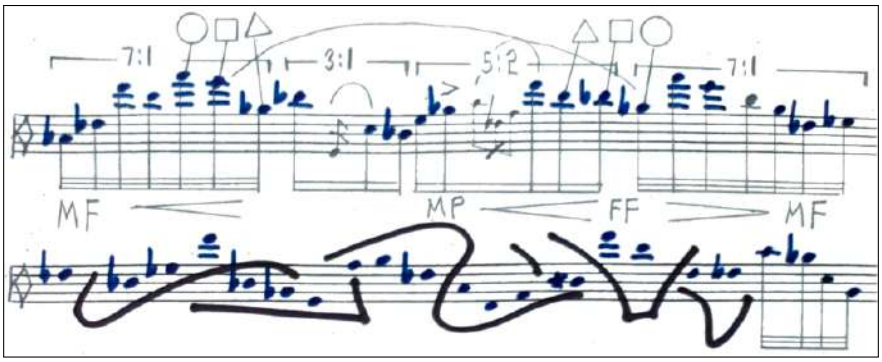
Despite all appearances, though, the twelve language types rarely if ever appear as such *in situ*. Rather than representative glyphs to be used in scores, the language types are better thought of as bite-sized sound- and process-concepts which might be applied in any scored or improvised context. Most famously, they serve as the conceptual framework around which *Composition No. 8A–8G* were improvised on Braxton's seminal unaccompanied saxophone album, *For Alto* (1969).[5] The mere fact that something as complex as constrained improvisation could be reduced to simple, two-dimensional glyphs and parametrized in terms of, say, duration and dynamic, again reinforced the notion that improvisers' creative

4. Lock, *Forces in Motion*.
5. Anthony Braxton, *Composition Notes Book A* (Lebanon, NH: Frog Peak Music, 1988), 118–49.

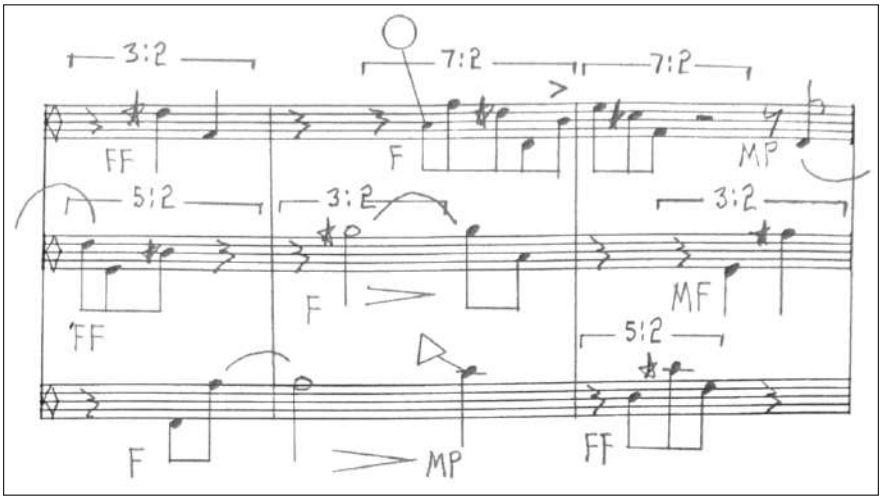
potential could be meaningfully harnessed in the context of a scored work. Given that Braxton demonstrated that well-structured works could be composed using exclusively these gesture-zones (buttressed, of course, by the virtuosic efforts of a stellar improviser), it seemed a comparatively small leap to inscribe these zones on the page in the interest of composer-performer communication.

Of course, (as demonstrated in the last chapter) not all of Braxton's notation schemata are so simple. Ghost Trance Music, in particular, which I began to study more closely around this time, served as a particularly fascinating example of integrative notation practices. Though the composition scheme would mutate considerably from its inception in the mid 1990s to its current form, Ghost Trance Music bears many consistent features across its instantiations.[6] Figure 4.3 demonstrates two such features:

6. Dicker, "SA16: Ghost Trance Music."



(a) primary melody



(b) secondary material

Figure 4.3: Excerpts from fourth-species "Accelerator Whip" class Ghost Trance piece *Composition No. 361* (2007) illustrating primary melody (above) and secondary material (below).[7]

In the figure, (a) is a brief excerpt of the "primary melody"—a long, unbroken melody which wends its way through the entire (often well over an hour long) composition. Where early Ghost Trance works often featured totally isochronous primary melodies sounding as a single, long line of quarter-notes, this late example obscures its primary melody almost entirely with ever-changing tuplets. Below (b) is the "secondary material"—polyphonic music printed at the end of the score which serves as a reservoir into which performers might jump at particular times to be determined in-performance. Bracketing the minutiae of the system's

7. Score available courtesy of a gracious loan by Prof. Fei.—See Dicker, "SA16: Ghost Trance Music" for more details regarding the various Ghost Trance species and classes.

organization (which deserve a dissertation all their own), I was taken, in particular, by the way Braxton was able to orient a composition around a fixed, unbroken melodic "flow" while at the same time building space for several levels of creative decision-making on the part of the performers (decisions which might equally validly be planned out on paper beforehand, hashed out in rehearsal, or arrived at spontaneously in performance).

George Lewis

Though more limited, I would be remiss not to mention my experience with scholar-composer-performer George Lewis' early work as well. One piece in particular, *Shadowgraph, 5* (for creative orchestra), which formed part of the curriculum in one of our large improvising ensembles, stood out as a particularly economical example of improviser mediation. Figure 4.4 gives a single page for the "saxophone" group where Lewis combines textual directives, traditional (and modified-traditional) notation in varying degrees of openness, and a single bespoke glyph (the triangle) indicating unconstrained improvisation. Here I was drawn to the work's modularity and flexibility: the piece (like many of the AACM's scored works) is meant to function with an ensemble of any scale and may expand or contract to fit any desired duration.

Of particular note, though, is the emergent structure of the performer-score interaction. As players navigate the grid, the choice of which sub-module is selected for play is contingent not only on the operant rules-of-play, but also on a continuous stream of sonic and visual data from the rest of the ensemble. The function of the score is to delimit the player's creative choices to adjacent sub-modules while simultaneously demanding a meaningful and relevant contribution to the overall texture within those constraints—a mode of play which strikes me as, in a way, once-abstracted from lead-sheet interpretations. Rather than simply rhythmically or harmonically re-interpreting a lead-sheet symbol to suit the moment's demands, a player (at least in my experience with the work) sits in suspense waiting for the best possible moment to deploy one of the four adjacent sound-zones in their quiver; selecting not the *right note*

but the *right mode of play* for a particular scenario.

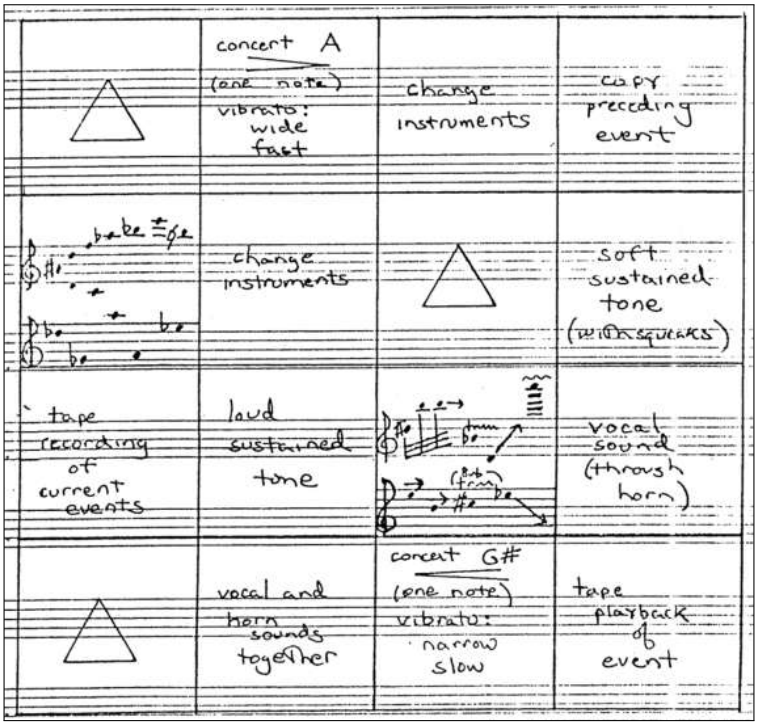


Figure 4.4: Excerpt (saxophone part) from George Lewis' *Shadowgraph, 5* (1977).[8]

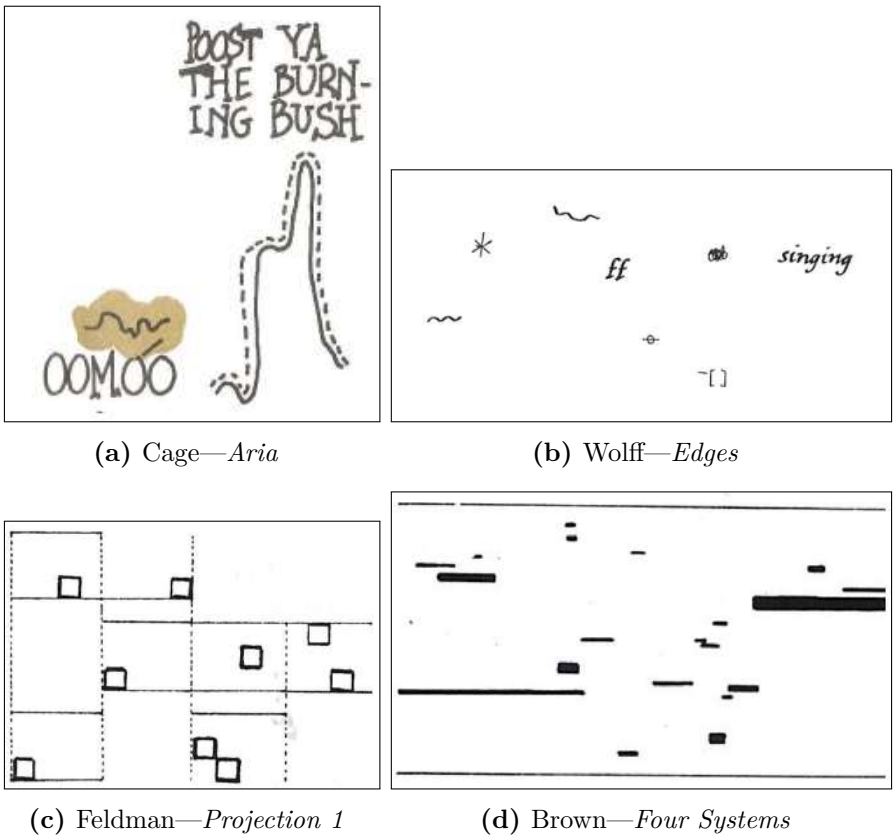
The New York School

Of course my model frameworks extended beyond those of the AACM as well. The New York School, specifically, generally loomed large in the Millsian collective imaginary; both in terms of their theoretical output and their compositional methods. Thus it is no coincidence that in Chapter One I alotted significant space to the unpacking of several new notation methods developed in the 1950s and early 1960s by the likes of John Cage, Morton Feldman, and Earle Brown. Owing, I think, to their relative conceptual simplicity and their ease of adoption by diverse ensembles, New York School compositions repeatedly cropped up in and out of the classroom.

These artists, steeped though they were in the literate Western art music tradition, treated

8. George Lewis, *Shadowgraph, 5* (New York: Edition Peters, 1977).

the score not as a mere afterthought—as a brute archival necessity or a means of mechanically translating S/PC to sound—but as an art object in its own right. However, this focus on the visual never compromised the scores' function *as scores*. Often (excepting, perhaps, the wilder of Cage's scores) golden-era New York School compositions seemed to adopt a Bauhausian functional aesthetic that reduced the notation's inducements and modifiers to their bare essentials: a rectangle for an instrument's functional range; a dot or a line for an inducement to act; its length or breadth a modifier. These were scores which could, in the span of an hour, be picked up and played with little ambiguity as to what, conceptually, the composer was seeking. Figure 4.5 is a small, semi-representative sampling of these scores' plain, economical visual traces.



(a) Cage—*Aria* **(b)** Wolff—*Edges*

(c) Feldman—*Projection 1* **(d)** Brown—*Four Systems*

Figure 4.5: (Brief!) excerpts from four semi-representative "New York School" compositions demonstrating minimal, comprehensible open notations.[9]

The lead sheet

Certainly not least among my influences pertaining to this research was my time spent (in various scenes and with varying degrees of dilletantism) as a jazz horn player, guitarist, and drummer. As discussed at some length in earlier chapters, the relationship between jazz performance practice and musical literacy is a complex one. However, it should be safe to claim, at the very least, that the lead sheet model of composition has since the 1940s at latest been the *de facto* standard means of inscribing jazz compositions for easier play, distribution, and archiving (Goodwin's "TuneDex" having been introduced in 1942).[10] As a musician who, for better or worse, has been concerned more with *breadth* of understanding of a given corpus than *depth*, I have typically relied on lead sheets for rehearsal and performance much more than musicians who routinely commit tunes to memory. As such, over the years I slowly became aware of the potent ways the lead sheet's stripped-down glyphs might impact improvised performances. Changing a simple E♭^{7} glyph into an E♭$^{7(\flat 9\sharp 9\flat 13)}$ has the potential to radically rewrite the field of potential action afforded to a player at a particular point in the composition. (For visual reference, Figure 4.6 provides one such lead sheet: an original manuscript of Thelonious Monk's evergreen "Monk's Mood" with the melody evidently transposed for a B♭ instrument.)

9. (a) John Cage, *Aria* (Edition Peters, 1958), ISBN: 978-0-300-73327-3; (b) Christian Wolff, *Edges* (Edition Peters, 1968); (c) Morton Feldman, *King of Denmark* (Glendale, NY: C. F. Peters Corporation, 1965); (d) Brown, *Folio and 4 Systems*.

10. See Ch. 1, "The Afro-diasporic return to open notation"—Abel, "Radical openness"

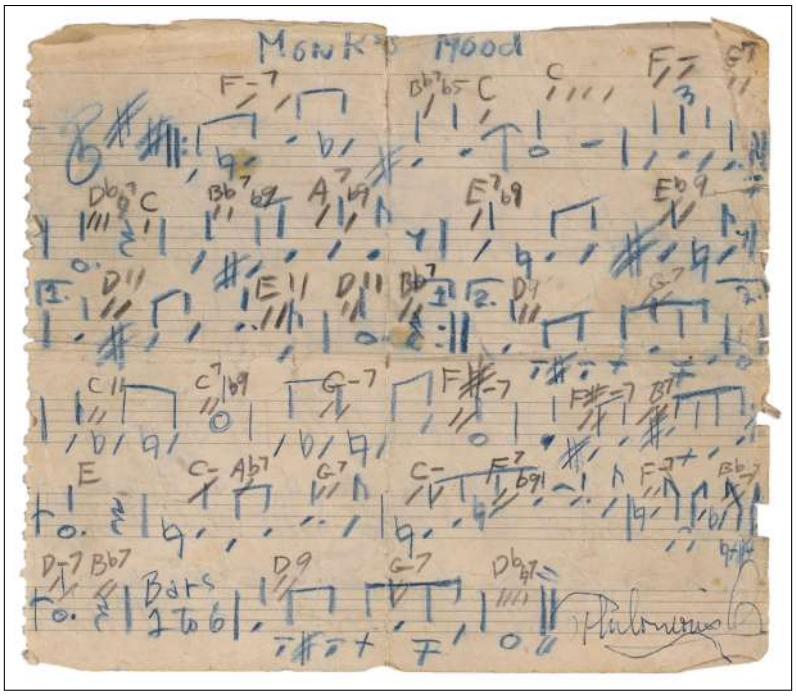


Figure 4.6: Original manuscript of Thelonious Monk's "Monk's Mood". Melody transposed for B♭ instrument.[11]

Lead sheets, after all, represent far and away the most common means of invoking and shaping a collective, creatively-constrained improvisation of any sort. Here as elsewhere, the score does not function as a complete system-unto-itself, instead relying rather heavily on syntactic and semantic standards which musicians must slowly accrue over the course of an entire musical career. However, for those already inducted into the system, the lead sheet (despite typically lacking the usual trappings of traditional scores—dynamics, expressive text, articulations, etc.) bears great power to influence precisely how players approach a tune. This provides an important object-lesson for the would-be notation designer. Namely: the clarity and efficiency with which a notation scheme is able to communicate is often contingent on factors external to the text—specifically the ways in which its users develop a working understanding of its use.

11. Sold at Bonhams, 16 June 2015 for $20,000!—Bonhams, *Lot 144: Monk, Thelonious Sphere. 1917-1982*, June 16, 2015, accessed October 18, 2023, https://www.bonhams.com/auction/22407/lot/144/monk-thelonious-sphere-1917-1982-autograph-musical-manuscript-signed-thelonious-m-monks-mood-1-page-new-york-c1956-7-6-34-x-7-12-inches/.

4.2 Designing a system

Having been exposed to so many laudable methods of writing for improvisers, it became apparent (sometime circa 2020) that the best way to ameliorate the problems I'd faced was (despite all attendant risks) to start work on my own humble notation scheme; ideally aggregating the best attributes of the above (pseudo-)systems while avoiding the pitfalls of haphazardly-constructed one-off "graphic" scores. The following section will describe the process by which I designed and implemented such a system. While I'll spare the reader an exhaustive enumeration of each relevant or marginally interesting detail, I will take care to point out particularly thorny or illuminating problems which cropped up along the way.

This system would be organized around a rather abstract central conceit: that of a sort of "subtractive" composition. Traditional notation on the whole might be thought of as a sort of coordinate system which, at its empty "rest state" (i.e. a blank score) denotes the musical null set (Ø); silence; no play. As symbols are added to the empty canvas of the score, play is induced. A single note represents a single attack with various parameters. Traditional notation is, after all, a system which from its outset (despite its many open forms) was used less for novel creation than for reproduction. If instead we desire the opposite—a system which privileges openness over fixity and production over reproduction—we must begin from the polar opposite standpoint. That is to say: the "rest state" of a notation for improvisers should denote the universal set—the set of all possible utterances. For a musician presented with a blank page, all is permitted; the composition denotes no boundaries. The job of our library of symbols, then, must be to pare down this universal set of utterances into a set of potential actions which befits the composer's sound- or process-concept. Here, an action is not built up from silence, but is arrived at through gradual restriction of possible musical moves. The clear analogy here is to two antipodal methods of sculpting. Where the model-maker builds via accretion, slowly adding bits of clay to a form until it eventually resembles some initial work-concept, the stone-carver visualizes a form trapped in the block of alabaster—the set-of-all-forms—freeing it by chipping away unwanted material.

In truth, not much changes in terms of practical compositional procedure under such a scheme: a composer still selects symbols for interpretation according to some desired sonic or gestural outcome and a performer still interprets them, producing sound. Given, however, that the notation is now organized entirely around varying degrees of variability/indeterminacy, we should expect that such a system should facilitate more complex and interesting forms of open music-making.

4.2.1 Design desiderata

Work was quite nebulous to begin with; amounting essentially to a small but growing list of desiderata. The following (presented in loose order of priority) constitute the various "non-negotiables" which I saw from the outset as particularly crucial to a functioning notation-for-improvisers.

(i) *The system should comprise entirely well-defined glyphs.* Given that the idea to develop a notation scheme in the first place was catalyzed by general dissatisfaction with vaguely- or undefined quasi-symbols, it was critical from the very beginning that each symbol be well-defined and behave identically across instances in a score (or across several scores).[12]

(ii) *The system should adequately balance broad range of potential sonic territory with symbolic economy.* As Pierre Boulez noted in a Collège de France lecture,

> In the case of known, familiar objects [...] with universal conventions, transcription is a simple matter, but runs the risk of influencing ideas to ensure that they can be included in a familiar mould without special problems. With new objects [...] whose codes are presently uncertain, even non-existent, transcription becomes difficult, imprecise, exaggeratedly complex – complex to the point of uselessness – because one no longer knows how to connect an over-elaborate notation to the object in question. The problem lies in the attention required by the signs defining the object that one wants to communicate – quantitative or qualitative.[13]

12. Again, this is not to somehow denigrate partially or purely-connotative notations which (as I hope Chapter Three has illustrated) can themselves give rise to great art—these are simply the initial boundaries set for the project.

13. Boulez and Nattiez, *Music Lessons*, 532.

In short, a system of signs is only as good as its ability to be decoded in the context for which it was designed. A system which over-multiplies its symbols in the name of ever-greater representative power runs the risk of requiring too much effort—cognitive, in this case—to decode. On the other hand, a system which is overly-stripped-down in the name of "readability" runs the risk of constraining that which it hopes to represent to too great a degree. Thus, any sufficiently mature notation scheme should be able to fluidly negotiate these two factors.

(iii) *The system should function equally as a means of transcription as well as performance.* One of the many strengths of traditional notation is its translational bi-directionality. That is: traditional notation is structured such that a page of well-organized symbols may be realized in sound, but equally that instrumental utterances may be usefully encoded in symbols directly with minimal signal degradation. In other words, a unit of notation's resultant sound is sufficiently tightly-coupled to an instance of a particular symbol that a listener may robustly re-encode a composition from sound alone. This fundamental attribute of the system allows music to be transmitted not only page-to-musician, but musician-to-page. Of course, being that my desired system would deal primarily in variously-constrained improvisation with indeterminate sonic results, it would always demonstrate a lower (read: noisier) signal-to-noise ratio. However, if designed adequately, the system should permit a musician to create a reasonably high-fidelity transcription of an improvisation which otherwise would be quite difficult to represent using traditional notation.[14]

14. To be clear, the desires for my project differed from those realized in Andrew Killick's "Global Notation." Where his system tailors the notation's encoding methodology to the needs of whatever musical practice is under scrutiny, my transcriptions would always be once-abstracted approximations prioritizing larger-scale clusters of gestures. That said, Global Notation represents a fascinating attempt at solving a centuries-old problem. Because different musical communities build their work-concepts from very different constitutive elements, transcribing a work in Global Notation necessarily involves considering multiple degrees of gestural fixity depending on whether the instrument/practice in question values rhythm over pitch; duration over meter; dynamic over timbre; etc. To that end, for any given instrument it provides a robust means of representing open vs. fixed pitch, open vs. fixed rhythm, and so on. For more information on the motivation behind and use of Global Notation, please see Killick's website.—Andrew Killick, *Global Notation*, https://www.globalnotation.org.uk/.

(iv) *The system should be easily integrated with traditional notation.* Rather than quixotically attempt to replace or subvert traditional notation, I thought it best to incorporate its strengths (not to mention musicians' existing musical literacy) into the new scheme. Thus, the system ought to allow any new glyphs to "slot in" alongside more familiar symbols.

(v) *The system should be reasonably intuitive to new adopters and sight-readable with minimal effort.* Traditional notation features a number of root-level attributes which persist across nearly all of its instances: regular mapping of time and pitch to x- and y-axes; left-to-right and top-to-bottom read order; inducement-and-modifier pairings, etc. A new notation scheme ought to preserve these foundational principles so as to facilitate integration with traditional notation and avoid unnecessarily bewildering the reader.

(vi) *The system should be useful without a strong background in traditional Western musical literacy.* As any sufficiently-experienced musician will tell you, virtuosic talent for improvisation does not always coincide with traditional musical literacy. A successful notation scheme for improvisers, then, should remain accessible even to those ill-versed in Western notation. That is to say: one ought to be able to construct well-formed scores entirely within the system itself.

(vii) *The system should be easily renderable using pen-and-ink on paper.* Given the utter ubiquity of electronic devices which can engrave or copy arbitrarily complex notation, this bullet point might betray my own aesthetic preferences more than it describes a non-negotiable attribute for a notation scheme. That said, it is unquestionably a boon to be able to quickly jot down an imagined sound-concept or overheard gesture without needing to resort to, say, iPad-specific software or a 3-D rendering engine.

Armed with these design constraints, I began by narrowing down (a) the parameters I would seek to encode and (b) the visual trace of the notation which would eventually encode

them. Initially I imagined the sorts of parameters I would (consciously or unconsciously) consider if I were tasked with "freely" improvising in the context of a composition: Would it be rhythmic or arrhythmic? Played with a noisy or pure tone? Involving some sort of imposed tonality or freely atonal? I found it helpful to visualize these parameters as a virtual bank of sliders which might be freely tweaked to suit the composer's desires. For a given gesture, these virtual sliders could either be held constant or varied. The presence of a slider in a particular position meant that its parameter was fixed, i.e. specified by the composer. Its absence would conversely denote an open parameter—one whose state at any given point would be determined by the performer. The notation's semantic fixity would therefore be continuously variable depending on the specificity of the encoding glyph(s). Figure 4.7 illustrates four hypothetical positions of these imagined sliders which each represent a possible gesture. If it was to be considered a success, the notation scheme would need to be able to represent each gesture distinctly (i.e., either with all parameters fixed in a particular position or with certain parameters fixed and others open) and clearly communicate their relative openness or fixity at a glance.

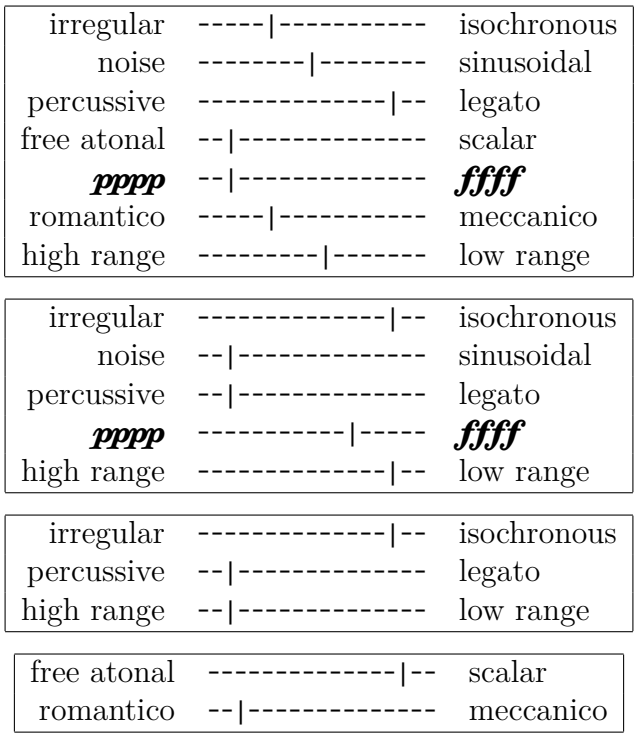


Figure 4.7: Four hypothetical parametric configurations for gestures ideally renderable in this as-yet-unnamed notation scheme, from most fixed (top) to most open (bottom).

The second primary consideration was the form of the graphic elements themselves. Given that these would serve as the tools by which gestures would be encoded as well as an interface for composer/performer communication, it was crucial that their design be well-motivated. From the very start I was particularly drawn to elegance and economy of Braxton's twelve "language types." Although that they were never meant to serve as notation as such, I admired their easy readability, their modularity, and their distinctive, stripped-down aesthetic. While the aforementioned twelve are the most frequently cited and reproduced of Braxton's categories of sound, a cursory glance at the introduction to any of the four volumes of his *Composition Notes* yields a treasure-trove of glyphs and the sound classifications they represent. Figure 4.8 gives a small sampling of these additional sound classifications not present in the initial twelve. Again, one is unlikely to see these glyphs

serving as notation proper while poring over the excerpted compositions themselves. For Braxton, they instead primarily serve to reify a particular S/PC in an quickly-referenceable form—acting more as a mental library of techniques to be deployed in composition in other forms. Like the original twelve language types, though, they provide an excellent model for the notation-designer seeking recognizable, easily-reproducible graphic forms with a high degree of representative power.

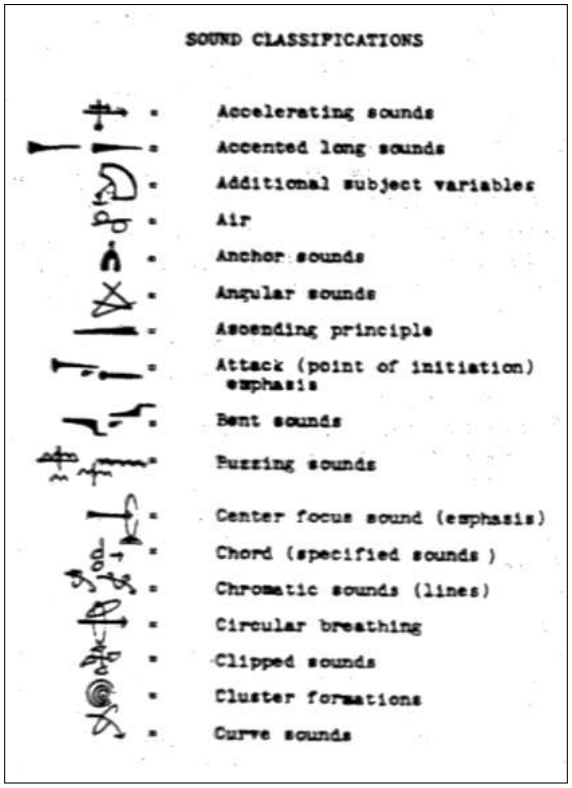


Figure 4.8: A sampling of additional "Sound Classifications" from Braxton's *Composition Notes*.[15]

15. Braxton, *Comp. Notes D*, v–x.

4.2.2 Early efforts

Graphic structure

My first exercise as fledgling architect, then, was to consider how to represent the twelve language types in my own notation (by now having been given the working moniker "Otto-Glyphs"—{O-G}) such that they might move beyond mere conceptual stand-ins for sounds.[16] Figure 4.9 gives an early sketch of this process. From quite early on, I wanted a way to illustrate both *global parameters* (which would apply across the entire modular gesture) and *local parameters* which might change over its course. As such I opted for an expanded version of Braxton's "head-and-tail" format where the "head" (the square in Fig. 4.9) initiates the gesture and contains information relating to global parameters and the "tail" (the glyphs which follow the head) show its duration and give changing local parameters. Global parameters here might take the form of a key or tonality (B♭$^{\triangle}$, VII, etc., in Fig. 4.9) or a technique (growling, sul pont.) and be expressed via text or common symbol in the "box." Local parameters (approximate pitch height, dynamic, attack envelope, silence) would be encoded directly in the "tail" itself via a combination of x- and y- coordinates, stroke weight, and empty space.

16. Please forgive the typographical flourish. Given that "ogee" is a term of art referring to serpentine curves (especially in architecture) I couldn't resist the temptation to incorporate curved brackets (comprising four ogees total) in the abbreviated name of the system.

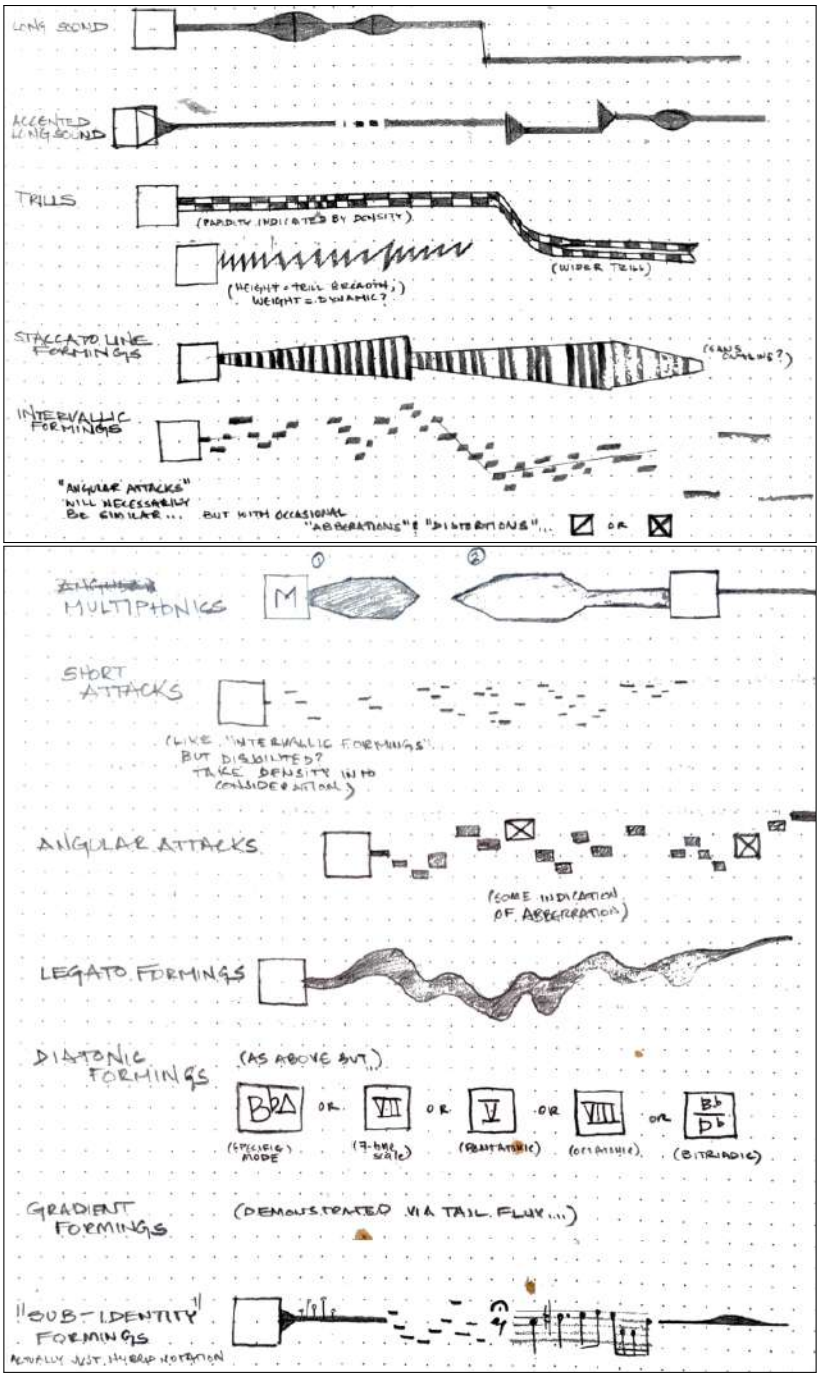


Figure 4.9: An early attempt to render Braxton's twelve "language types" into {O-G}.

Brackets

This exercise alone gave enough shape to {O-G} that I could begin experimenting with short scores comprising these types of gestures—leading rather quickly to some key expansions of the system. From the outset, {O-G} was conceived as a means of more finely controlling notational semantic fixity—of providing greater or lesser degrees of informational specificity to a performer. What it so far lacked, however, was a way of efficiently communicating rapid, radical changes to this fixity. As we saw in Chapter Three, *Composition No. 76* provided its performers with clear boundaries between gestures which are to be performed (at least loosely) as-written and those which are to form the basis for a more radical form of creative contribution. To achieve a similar clarity, I began to incorporate bracket notation akin to the type used in *L-R-G*. An empty space on the score wrapped by square brackets would denote the aforementioned "universal set" of improvisatory gestures—i.e. the direction to "freely improvise." The creative potential for a fixed/open "on/off" switch could exceed this simple binary, though. Here I'll quote directly from the user's manual (to be discussed in further detail later in this chapter).

> In essence: any time brackets appear, they should be read as: **play something *in this manner***. How precisely ***in this manner*** is interpreted will of course differ greatly between performers. For instance: Where this figure...
>
> 
>
> indicates *three short attacks and a brief legato passage* across a particular duration, its bracketed counterpart
>
> 
>
> asks the performer to play using these *sorts of* gestures for the duration indicated by the brackets/arrows. Rather than specify certain sounds in certain orders, the bracketed gesture gives a player a sort of "sonic territory" to occupy for a given time. The player ought to feel more "freedom" with respect to the execution of the material therein than with the more cut-and-dry plain gestures.[17]

17. *Otto-Glyphs*, pg. 19–20, Appendix

To my mind, incorporating this "rapid-traversal" mechanism would both (a) provide the player with a visual cue to quickly reconsider the way a certain gesture might fit into the prevailing texture and (b) grant them the creative liberty to reshape the components of that gesture to suit the moment's needs.

Relational parameters

Another key development which followed initial experiments was the development of signs for cuing and other relational parameters. Braxton's relational codes (as referenced in Chapter Three—DOM, SUPP, OP) provided a simple working model for how these might be deployed. It seemed intuitive, though, that these codes might be expanded to allow more a more fine-grained shaping of these inter-musician relationships. By default, any performance practice for which improvisation is a central organizing factor sets up listening-response feedback loops between its performers. Instituting these relational parameters, though, allows this feedback itself to serve as a locus of creativity in a way that is typically inaccessible to composers.

By far, the best examples of fine-grained relational composition come in the form of conducted improvisations—namely Butch Morris' "Conduction" system and Walter Thompson's "Soundpainting." Since I unfortunately lack the space or time to expound in any great depth on the fascinating living notation which forms these systems' foundation, it must suffice for now to briefly touch on the ways they impacted the early development of {O-G}. Admittedly, my firsthand experience with Conduction and Soundpainting was limited to strictly unofficial exercises—sometimes in accordance with the letter of the official manuals and other times in a sort of unholy amalgam of the two systems. Regardless, it is a testament to the efficacy of systems like these that even watered-down or corrupted versions may serve to meaningfully sculpt six, twelve, or thirty improvisers' creative output—even ones with wide variance in level of expertise, reading ability, experience with they system, experience improvising, etc. Despite the fact that the systems differ greatly in terms of central motivating ethos, both systems share general encoding principles: some central organizer (conductor or Soundpainter)

incites and modifies gestures elicited from a player or group of players. The conductor then deploys a series of hand- and body-gestures, drawn from a symbolic library of such gestures made known to performers beforehand. Like other forms of notation, these composer-gestures comprise inducements which call for some sounding and modifiers which manipulate the performers' gestural parameters. As improv-centric systems, composer-gestures tend to be oriented toward creative constraint of players' actions—calling for open improvisation which is somehow pared down according to an intended dynamic, tempo, technique, etc. However, both systems feature codes which allow for quite precise inducements, even allowing encoding of precise melodic and rhythmic elements; practically on the order of traditional notation (though, admittedly this represents a comparatively rare use-case).[18]

Naturally, the "conductive arts" differ from traditional scoring methods insofar as they allow continuous, live interplay between the players' sound-producing gestures and the conductor's gesture-producing gestures. This allows for compositions comprising pre-planned sequences of signs to be radically altered or abandoned all together if desired. Nevertheless, I came to think of {O-G} as a sort of flattened, concretized form of (small-c) conduction. Walter Thompson, in the first of a series of workbooks, lays out the component-level structure of Soundpainting thus:

> The 43 gestures in Soundpainting Workbook I fall under 2 general categories: Sculpting gestures and Function signals.
>
> Sculpting gestures indicate *What* type of improvisation and *How* it is to be performed, and Function signals indicate *Who* performs and *When* to begin performing.
>
> *Who*, *What*, *How*, and *When* comprise the Soundpainting syntax. [...]
>
> The Soundpainting syntax is further broken down into 6 parts:
>
> 1. Identifiers (*Who* is performing)
> 2. Content (*What* type of improvisation)
> 3. Modifiers (*How* to perform the improvisation)
> 4. Go gestures (*When* to begin performing)
> 5. Modes (a set of parameters affecting specific gestures)

18. Lawrence D. "Butch" Morris, *The Art of Conduction – a Conduction® Workbook* (New York: Karma, 2017) and Walter Thompson, *Soundpainting: The Art of Live Composition Workbook I* (New York, N.Y.: Walter Thompson, 2006).

6. Palettes (sections of notated or rehearsed music, text, choreography, or visual design)[19]

The workbooks go on to provide dozens of directives, denoting a wide range of performer actions from very simple, sound-oriented gestures ("long tone," "hit") to much more complex ones which actively modulate the degree of performer interactivity in performance. The "shapeline" gesture, for instance, requires that performer "musically perform the physical shape the Soundpainter creates with her/his body—physical graphic notation" where the "synchronize" gesture asks a performer to "[synchronize] specified material with specific performer(s).[20] Again, bracketing *live* composer interactivity, it was my hope that {O-G} could function much in the same way. Systems were already in place which allowed for a parallel "*Who*, *What*, *How*, *When*" organizational structure. "*Who*" and "*When*" are handled in the same way as traditional notation: by position and alignment on the page. "*What*" and "*How*" are accomplished by conceptually transposing the four-dimensional movements of a conductor into two dimensional black-and-white glyphs. At this point, {O-G} only needed more refined ways of establishing and modifying performer-to-performer and performer-to-notation relationships. Figure 4.10 illustrates an early attempt to workshop these signs and Figure 4.11 shows their current form as of time of writing. Here, "match," "build upon," "echo," "memorize," "recall" signs in particular were borrowed from my experience with conduction, while "dominate" and "support" refer directly to the aforementioned *Composition No. 76*.

19. Thompson, *Workbook I*, 4.
20. Ibid., 34–5.

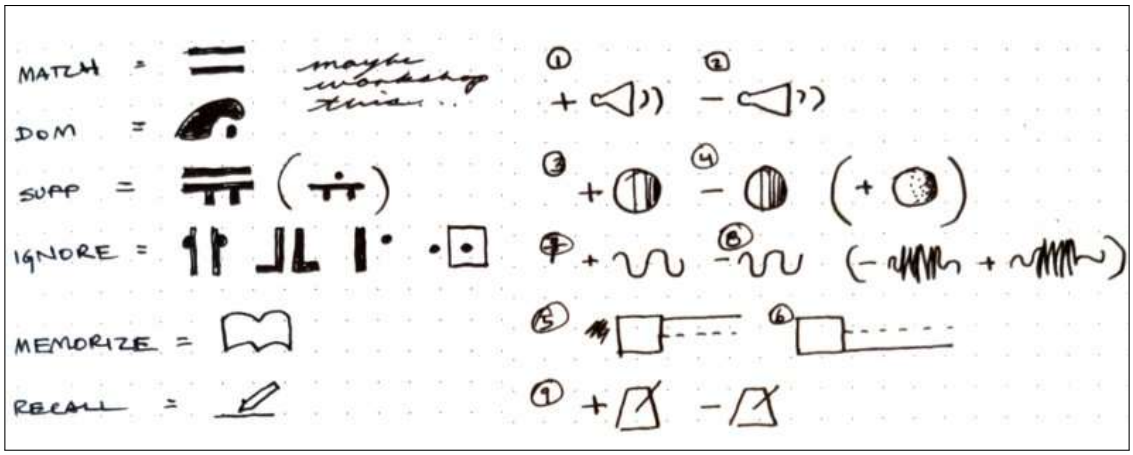


Figure 4.10: Workshopping relational glyphs.

some common examples

match x	match target's playing (in terms of pitch, rhythm, timbre, etc.)
ignore x	perform as though target is not present
support x	perform in such a way that target serves as the "foreground" to your "background"
dominate x	perform in such a way that target becomes "background" to your "foreground"
build upon x	develop an idea presented by target (either another player or a previous gesture)
echo x	serve as an "echo" to target player or gesture
memorize x	commit (some aspect(s) of) target to memory for later use
recall x	recall that which was committed to memory in the "memorize" gesture

Figure 4.11: Relational glyphs: current form.

4.2.3 *Device for Encouragement of Applause*

By this point, with the system having grown to include a basic inducements-and-modifier structure, a means of subtly or radically modulating notational fixity, elements allowing cuing

and modification of relational parameters, and now a growing library of basic symbols, the time had come to put the notation scheme into practice. The opportunity to do so arose in 2021 when I was tasked with composing a short (ca. five minute) new work for a mixed ensemble drawn from UC Irvine's ICIT[21] and other music department graduate students.

The basic theme of the work was the concatenation of two distinct, non-interactive modes of play in a background-and-foreground arrangement. The background—intended to recall a kind of Satiean "furniture music"—comprised bass clarinet, 'cello, and flute reading from a more-or-less traditional score (Score A) on one extreme end of the performance space.[22] Players of Score A self-pace a slowly-pulsed pad of clusters drawn (intuitively, essentially) from an evocative pitch-class set {0, 2, 3, 4, 6, 7, 9, T, E} (Messiaen's third mode of limited transposition) which was used as a harmonic reservoir. This pad texture was to loop unobtrusively behind the foreground for the composition's duration. Figure 4.12 gives a one-system excerpt of Score A illustrating a type of proportional notation. Durations of tones and silences are determined by the 'cellist's cues.

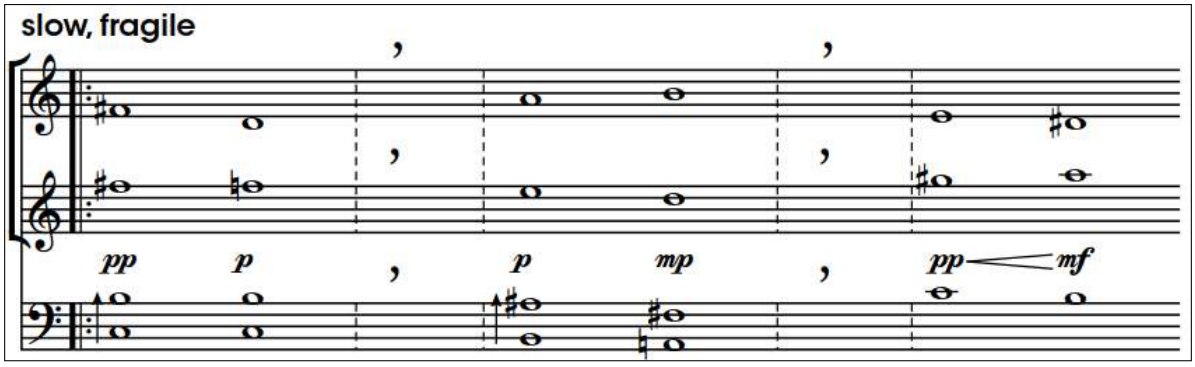


Figure 4.12: *Device for Encouragement of Applause*—Score A: System 1.

The foreground, on the other hand (Score B) was made up of an improvising duo on trap set and contrabass (located at the opposite end of the space).[23] Acoustically, I intended that Score B would evoke a chattering, unstable conversation; replete with unexpected, short

21. Integrated Composition, Improvisation and Technology.
22. In performance: Isaac Otto—bass clarinet, Bella Pepke—'cello, Rebecca Larkin—flute.
23. In performance: Steven Lewis—trap set, James Ilgenfritz—contrabass.

shouts and frightened murmuring in response. Where Score A would swell and ebb in unison with only the barest inter-musician communication in the form of cuing nods, Score B was to feel more chaotically interactive.

Gestures for the duo were also fully-notated—only now entirely in {O-G}. As this was to be the system's maiden voyage, I took care to to limit Score B's vocabulary to only a few distinct types of gestures. This way, I would be able to focus my efforts on assessing and fine-tuning the ways players interacted with the notation rather than on coaching performers on dozens more unfamiliar glyphs. Unlike Score A, which was entirely ensemble-paced, Score B featured no repeats and was paced by stopwatch, reducing the potential cognitive load on relying exclusively on intra-ensemble cues for pacing. Figure 4.13 gives the first page of Score B illustrating this reduced feature-set. Of particular note is the occasionally extreme rate at which the duo here were required to re-assess (consciously or unconsciously) the openness of a given gesture. From the 1'30" mark to around 2'15", the bassist must perform two "in this manner" gestures (in semi-metronomic time) followed by fixed low tones interrupted by a harmonic—then must execute an open segement with overpressure, a fixed glissando upward, another open segment, and a fixed quiet *col legno battuto* gesture all within the span of around thirty seconds (see Figure 4.13). While this is not a particularly onerous passage technique-wise, this rapid oscillation between fixed and open modes of play requires a constant renegotiation of one's relationship to the notated material itself (and therefore to the letter and spirit of the composition) as well as to one's bandmates.

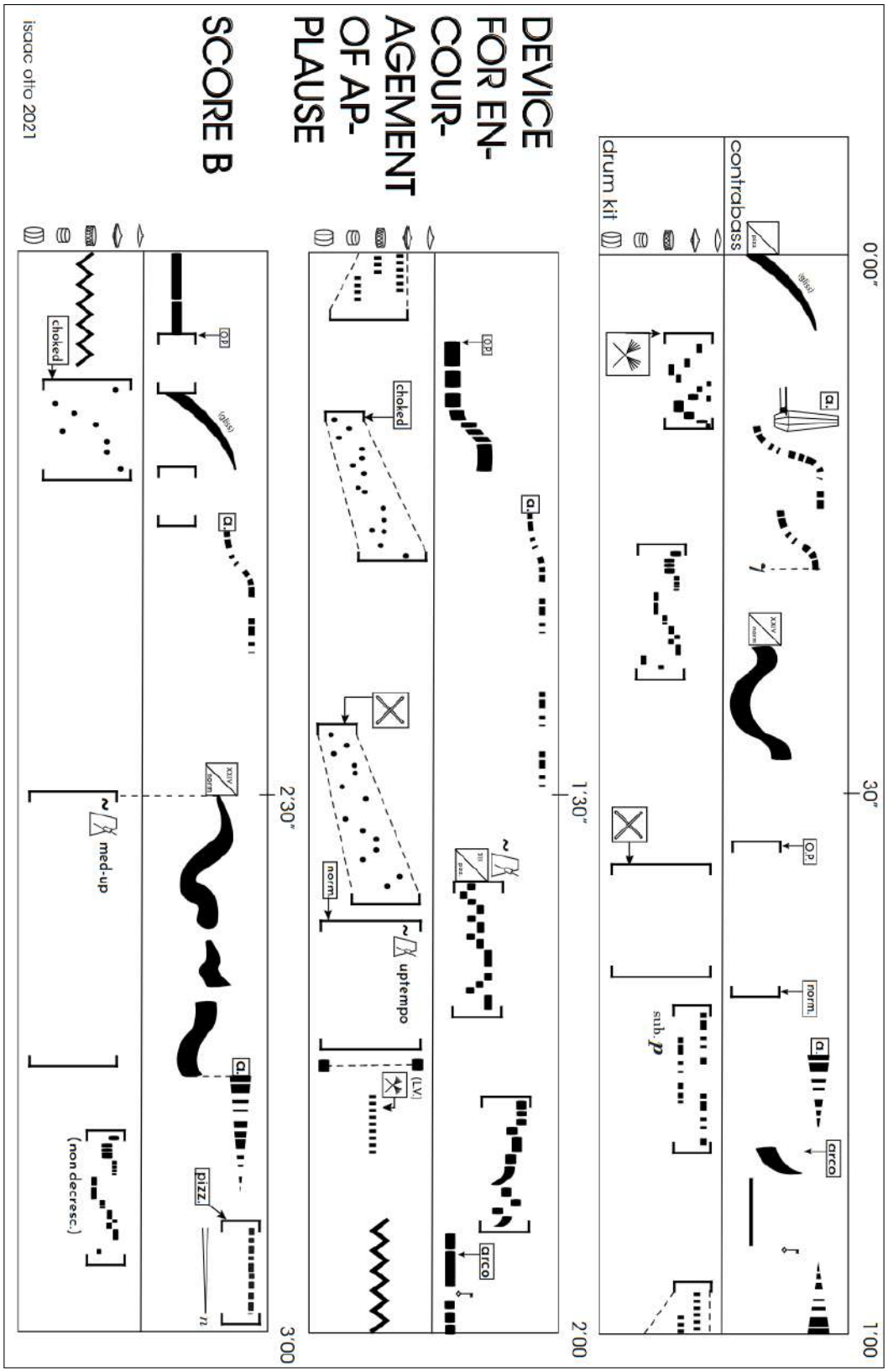


Figure 4.13: *Device for Encouragement of Applause*—Score B: Systems 1–3.

One key issue which arose during the composition process was that of instrument-specific glyphs. Having primarily performed as a woodwind player for the last decade or so, and having been initially inspired by Anthony Braxton's aforementioned language types (themselves designed around unaccompanied saxophone improvisation), I perhaps inadvertently designed {O-G} such that its structure demonstrates a prejudice for pitched, monophonic instruments or at least for gestures which behave monophonically. The fundamental units of notation here are dots (indicating short attacks), lines, and curves (indicating longer attacks undergoing some sort of flux). This did not pose a problem in particular for the bassist here, whose prescribed gestures do not involve any polyphony/homophony and who can happily map pitch to the y-axis without any issues. The default mode of play for the percussionist/drummer, on the other hand, is one in which attack durations are determined by the physical structure of the instrument and the initial conditions of the strike. Of course, percussionists have many means of producing swells, drones, and other continuous attacks—but their instrument overall favors polyphony and fixed-duration attacks and does not allow convenient one-to-one pitch/y-axis mapping. The solution for the work (eventually titled *Device for Encouragement of Applause*) was to map the individual elements of the drum set to loose spectral regions of the pitch axis—from the kick drum, naturally assigned to the lowest sector, up to the crash cymbal. Note the resultant discrepancy between the average gestural shape for contrabass (fluid, legato, high dynamic contrast) versus that of the trap set (granular, staccato, unspecified dynamic).

This non-trivial "translation" from percussion-gesture space to pitch/time space necessitated further clarification on my part during the rehearsal process. For instance, it was not crystal-clear from the outset precisely how "pitch" data within a given instrument-band was to be interpreted; i.e. whether three dots (indicating individual attacks) at different heights on a single "instrument" were to be taken to denote different resultant pitches. In this instance (as in the case of other ambiguities which inevitably cropped up), the result was to privilege the demands of the here-and-now in performance. In essence: if the score

presents some information which, given a particular performance scenario, doesn't appear to map cogently to any relevant musical parameter, then it should be discarded. If under another circumstance, however, the information presented yields a clear mapping, then it should be executed as faithfully as one deems fit. As a toy example: the player might treat the snare as a temporarily-pitched instrument by applying pressure to the drum-head with the elbow; changing its spectral centroid. In this case, the ambiguous pitch-data are now given contextual meaning and are therefore executable.

Post-performance, I was heartened by {O-G}'s extremely positive performer reception. Though we'd had only precious little time to rehearse, the instructions given with the score in tandem with a few composerly pointers here and there in rehearsal proved sufficient to get at the sound-concept I'd had in mind. Besides the aforementioned percussion-related ambiguity, the notation (perhaps owing to its deliberately simplified construction) was able to both (a) evoke clearly-denoted fixed gestures with predictable sonic results and (b) provide gently "colored" space for more open improvisation. Both performers reported that after the initial learning curve, the notation seemed to be able to leave room for creative interplay despite its density and, further, that much to my delight, passing through zones of relative fixity and openness had had a clear impact on their phenomenal experience of the score; that the fixity gradient was actually palpable, even after the signs on the page had begun to be ingrained in memory.

4.3 Praxis: composition and concert

Emboldened by this freshman success I wasted little time preparing for the next two developmental milestones. First, given that even a relatively simple {O-G} score (*Device...* Score B) had required a fairly extensive instruction page, I decided to set about creating a formal "user's manual" which would serve as the first point of contact between {O-G} and its potential interpreters. Formalizing these symbols such that they functioned identically

across scores would force me to carefully consider how to articulate not only the "rules of the game," but also my mission statement at large; what, precisely, I hoped to achieve with this humble set of glyphs and most importantly how I hoped to balance composer and performer agency in a system meant to optimize for both. Second, I made the decision that the "capstone" concert marking the culmination of my work in ICIT would exclusively comprise works written (at least in part) in {O-G}. The length of the concert would give me the opportunity to demonstrate (via a number of shorter pieces) the system's polyvalence. In particular, I wanted to demonstrate its ability to sculpt a wide variety of sound worlds and to serve the different needs of several diverse performance contexts—whether it be gently shaping otherwise open improvisation or integrating with traditional notation in a particularly fine-grained way.

4.3.1 Instruction manual

The central aim of the instruction manual was to digest the feedback (both positive and critical) from performers' experiences with *Device...* and use it in service of a technical document which, while not intended to list each glyph's every conceivable use case, would formally introduce performers to {O-G}'s syntax and some of the more common symbols. This necessitated the nailing down of a few more formal features which had theretofore been inconsistently- or poorly-defined—features I will enumerate in part here. For completeness' sake I have provided the full manual in the first appendix for the reader's perusal.

Of foremost importance, to my mind, was a robust explanation of the system's take (read: my take) on "rule-breaking" as an integral aspect of performance in {O-G}. Rule-breaking is, of course, a critical component of any performed music insofar as the performer is always the final filter of the composer's creative intent. A performer maintains exclusive executive control over how music is actually created in that it is their mind, body, and instrument which produce the sound at the end of this causal chain. Certainly, music-making paradigms vary greatly in the degree to which they proscribe or encourage creative rule-breaking. However,

I think it fair to say that very rarely is an "official policy" ever directly articulated. To rectify this perceived absence, I added the following to the manual's introduction (an excerpt verbose enough, I hope, to not require additional commentary):

> Any simple, flexible system of notation such as the one I've sought to realize here could certainly be deployed to suit a wide variety of musical/procedural aims. Indeed it is conceivable that one might, given the right inclination, use this open notation to merely reproduce the traditional composer-over-performer hierarchic paradigm. My goal, however, is precisely the opposite: to build upon the ethos inherent in improvised musics which emphasize co-composition and the **primacy of the moment**.
>
> That is to say: in performance, musical situations will inevitably arise which seem to demand a general contribution that runs counter to what is "prescribed" in the notation. Perhaps the prescribed dynamic is far too timid for the latent energy of the passage; perhaps a sudden rim shot on the floor tom would propel the music into beautiful new territory—a situation unforeseeable prior to performance. As I conceive of it, the primacy of the moment-in-performance **demands** that the player heed these calls by making a contribution which deliberately "disobeys" that which has been laid out by the composer ahead of time. The notation has already "done its job," so to speak, by sculpting the perceived boundaries of improvisation—it is still incumbent upon *performers* to make the music. I trust the good taste and musical sense of the performer over my prescriptive compositional ability any day. Thus the performer should allow her in-the-moment judgements to supplement and/or override notational prescriptions should the music demand it. Improvised music is decisively a quasi-democratic pursuit—performers should not be shy about *improvising their musico-social roles* as well as the music itself.[24]

With this important root-level clarification out of the way, I was able to move on to the task of pinning down some of the more recent additions to the system which I'll quickly sum up here.

Proportionality/Duration I had initially conceived of the system as functioning strictly proportionally—i.e. with duration of a gesture always directly proportional to the extension of the glyph the x-axis. However, in the end I opted to grant an additional degree of creative liberty to the performer(s) by allowing that (unless otherwise specified by time stamps, cues, or the presence of traditional time signatures) gestures be durationally-extended as far as the performer desires; so long as the salient features of the gesture itself are proportionally

24. *Otto-Glyphs*, pg. 10–1, Appendix A.

distributed within.[25]

Curve topography Using curves to indicate melodic contour comes with its own potential issues. Curves in {O-G} have consistently been used to represent legato phrases of an approximate shape as opposed to, say, a continuous glissando. As such, a performer might expect that a faithful interpretation of a single (unbracketed) "S" curve could involve at most two changes in direction—and likewise that an undulating line would require many, many changes of direction in order to be rendered accurately. It became clear early on that these curves are best thought of as once-abstracted contours that demonstrate larger-scale features of a melodic line and that in realizing them, performers ought to have the liberty to introduce more granular topography than would be otherwise implied. See Figure 4.14.

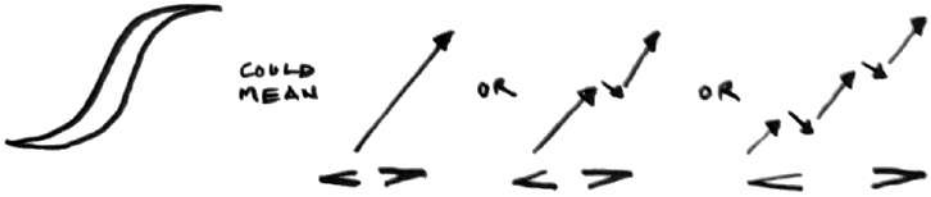


Figure 4.14: An illustration of the several potential interpretations of a simple curve.[26]

"Lollipops" In testing, the need often arose to proportionally modulate some parameter which was impossible or unwieldy to indicate in the glyph itself. For these situations I began incorporating "lollypop" glyphs which would be labeled with the relevant parameter and raised and lowered depending on the parameter's relative state, then connected to indicate continuous (linear) change. This allowed me, for instance, to specify the intensity of a vocal growl for a saxophone gesture or the position of the bow relative to the bridge for a violin gesture (see Figure 4.15).

25. *Otto-Glyphs*, pg. 15–7, Appendix A.
26. *Otto-Glyphs*, pg. 21–2, Appendix A.

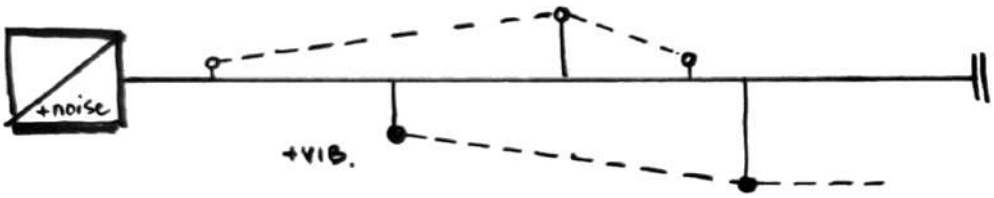


Figure 4.15: An illustration of one potential use of "lollypop" glyphs. Two parameters ("noise" and "vibrato") are continuously varied over a stable long tone.[27]

Instrument-specific glyphs By the time I finished the manual, I had not yet completed the works for the capstone concert, nor was I certain of the musicians I'd be employing. Nevertheless, I thought it important to include a few instrument- or family- specific glyphs such that I might better tune the compositions to the needs of my future ensembles. (These included, for instance, special textures indicating homophony, specific treatments for double- and triple-stops, multiphonics for winds, harmonics for strings, and mutes for brass.) I mention this not because the chosen glyphs are particularly interesting, but because the notion that family-specific symbols are required at all raises an important question discussed earlier in the desiderata: In designing a system of notation oriented toward (among other things) ease of adoption, how does one responsibly balance *coverage* (i.e. encompassing as broad a range of semantic content as possible) with *economy* (i.e. not employing so many symbols as to over-tax the new player)? In this particular instance, the question is essentially moot; the manual on the whole is only 51 pages long and can be breezed-through in an hour. However, as the system grows to encompass more and more varied performance scenarios, this question will become increasingly relevant. Though I have not yet been tasked with composing a work in {O-G} for, say, a modular-synthesist, such an instrument with its many, many manipulable musical parameters could pose a challenge for a system which from its outset was designed around one-line instruments with (comparatively) limited ranges of pitch,

27. *Otto-Glyphs*, pg. 29–30, Appendix A.

dynamic and timbre. See Figure 4.16.

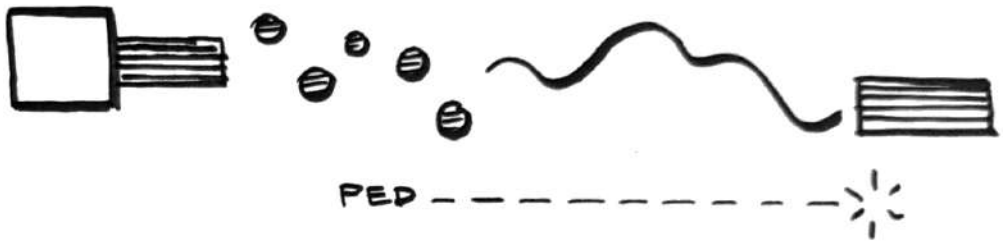


Figure 4.16: An illustration of a gesture for keyboard using both homophonic and monophonic textures.[28]

4.3.2 "Capstone" compositions

The compositions selected for the capstone performance consisted of both entirely new works written for the occasion and then-unperformed older works which were adapted in various ways to accommodate {O-G}. As discussed above, one important goal of the creative wing of the project was to demonstrate the aesthetic and structural breadth which might be achieved with even a relatively simple notation scheme, assuming it is sufficiently well-defined. As such, I constructed and compiled compositions so as to display this range as much as possible. This section will briefly talk through select compositions; describing what I take to be their most notationally-noteworthy features.

W/M

W/M was developed early on as a sort of {O-G} étude for flexibly-sized ensemble.[29] Material was presented in the form of a performer-navigable grid of 48 square cells; identical copies of which were given to each performer. Rules of play were constructed such that total duration would remain stable across performances, but that performers would be granted a degree of

28. *Otto-Glyphs*, pg. 41–7, Appendix A.

29. In performance: Isaac Otto—winds, Bella Pepke—'cello, Steven Lewis—trap set, James Ilgenfritz—contrabass. For complete score, please see Appendix C.

latitude over the onset and duration of individual cells within the chronological framework. Specifically, performers were to trace a path first from *A-i* to *H-vi* moving only downward or rightward, then upon reaching *H-vi* navigate back to the start moving only upward or leftward. Each cell was to be executed within a thirty-second "frame" but might be played at any pace. The cell could thereby occupy the entire frame (leaving no silence) or only a small portion of it (leaving predominantly silence). Performers were meant to remain cognizant of the global sound-world and make creative decisions within this tightly constrained framework in order to bring about the best possible balance of material and silence. Figure 4.17 demonstrates twelve modules *in situ*.

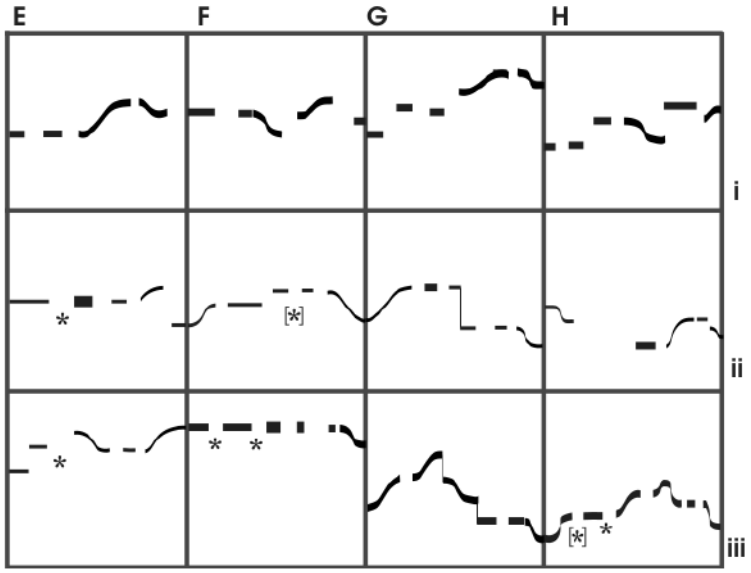


Figure 4.17: *W/M* excerpt illustrating grid and twelve modules.

Given that the work was meant to serve as a primer, the material for each module was drawn from an extremely limited reservoir of techniques: single-tone attacks of various durations and dynamics, short legato phrases, and two types of "interruptions" (given by the asterisk and bracketed-asterisk figures). A simple generative scheme was used to construct the work's "dramatic arc" (such as it is): Each move away from the origin *A-i* (comprising only a single long tone) adds one degree of complexity to the module which might be a length of silence, a jump in relative pitch, a legato phrase, or an interruption. Consequently, as players

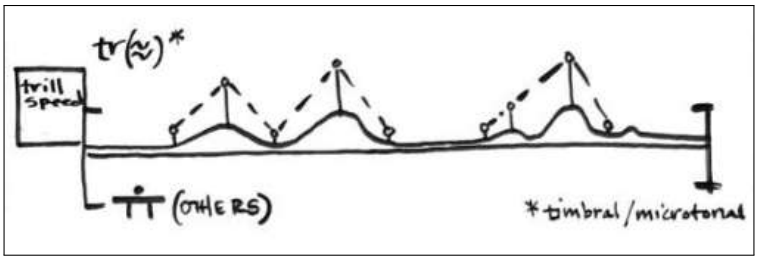
move toward *H-vi*, they achieve a collective increase in sonic complexity which wanes again as they return to the origin.[30] To my mind, the limited set of materials and gradual waxing and waning of complexity throughout the piece would both (a) allow players to become more accustomed to "thinking in" {O-G}; learning to interpret each module as proportionally fixed but durationally open, as well as (b) explore how players use bare-essential materials to construct a cogent sonic landscape according to their personal improvisational aesthetic.

Q-Tet

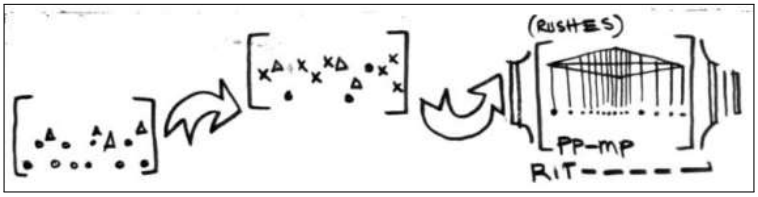
Where *W/M* presented {O-G} in a rather rigorous, "closed" form, *Q-Tet* aimed to be precisely the opposite.[31] The score consisted of four parts—one each for horns, percussion, piano, and contrabass. Each part presented the player with five gestures; four of which were in "pure" {O-G} and one (at the center of each part) in mixed traditional/{O-G} notation. Examples of both of these types are given in Figure 4.18. From the outset it was made clear that *Q-Tet* was intended to be first and foremost an open-improvisatory piece—just one that momentarily moved through these five inscribed gestures. As such, beginnings and endings as well as interstitial material were left up to the performers' creative whims. The only requirements vis-à-vis written material were that each (a) each gesture be interpreted at some point during performance, (b) that the gesture marked "FIRST" be the first written gesture interpreted and "LAST" be the last, and finally that (c) the central gesture be interpreted as literally/faithfully as possible.

30. For thoroughness' sake: "bare" asterisks represent interruptions to the prevailing texture using any material desired so long as the interruption remains proportional to the cell. As the glyph for the interruption occupies only a small fraction of the space, these should be brief. Bracketed asteriks on the other hand represent "open" interruptions which need not be proportional to the durations given in the cell. They might be of any duration so long as they do not violate the thirty-seconds-per-cell rule. Ideally these interruptions (essentially short "open" bursts of sound) would introduce enough variety to the material to avoid aural fatigue.

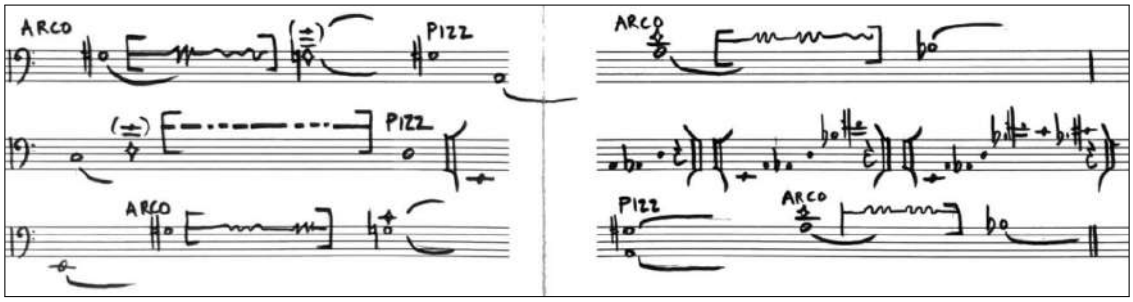
31. In performance: Isaac Otto—winds, Matthew Nelson—tenor saxophone, James Ilgenfritz—contrabass, João Martins—piano, Atticus Reynolds—trap set. For complete score, please see Appendix D.



(a) Horns—peripheral gesture.



(b) Percussion—final gesture.



(c) Bass—central gesture.

Figure 4.18: Examples of three gestures found in *Q-Tet*.

Given that nearly all initial, peripheral, and final gestures were presented in brackets, performers were granted a great degree of creative liberty in the way they interpreted or transformed {O-G} materials. This was meant to contrast with *W/M*, in which grid modules were (save for interruptions) entirely free of brackets. Given this more relaxed play-environment, I employed more sophisticated notation here: "transition" arrows (which prescribe gradual transitions from one sound- or gesture-space to another—shown in sub-figure 4.18b), unspecified parametric "lollypops" which require a player to map their own desired parameter to the changing stem-height, and relational modifiers which require the accompanying gesture support other players' expressions (both featured in sub-figure 4.18a). The more-fixed central modules also permitted a degree of experimentation in combining multiple forms of notation, as had always been one of the system's core desiderata.

Sostanza come il Sangue

Procedural composition has consistently been a feature (if not a core focus) of my approach; typically used as a means of offloading some creative decision-making to relatively simple algorithms in order that I be able to focus my efforts on some other aspect of composition. These might take the form of sieves which handle the selection of pitches from a central reservoir; the imposition of a dramatic arc via modulating attack density across one movement of a work; or the selection of which simultaneities are to occur between players across an entire piece. As a general rule, I favor conceptually simple algorithms which might, if need be, be worked-out with pen and paper but for which simple programs might be written to expedite this work. *Sostanza come il Sangue* represented my first attempt to rigorously combine a nearly-completely procedural composition with {O-G} notation.[32]

Pre-compositional material was developed using a bespoke Max[33] patch in conjunction with *bach*, a third-party package designed to facilitate computer-aided composition.[34] (See Figure 4.19 for patch architecture.) Aesthetically, the overarching goal was to find a sort of twice-abstracted Bach chorale texture which, on the short term, appeared to wander aimlessly but which, over the course of the entire work, eventually found its way to relative stasis. To that end, I sought to generate six non-interactive monophonic lines (tenor saxophone, B♭ clarinet, trombone, left and right hands of the piano, 'cello) which each behaved according to set of simple rules. Each voice was given a central "destination" pitch as well as a starting pitch some distance away from it. At any given point, the distance in pitch-space between the current position and the "destination" influenced a probability weighting variable. This variable was used to determine whether the pitch in question would remain stationary or move. The further from its destination, the more "anxious" and motile it became; as it got

32. In performance: Isaac Otto—B♭ clarinet, Matthew Nelson—tenor saxophone, Collin Felter—muted tenor trombone, João Martins—piano, Bella Pepke—'cello, James Ilgenfritz—conductor. For complete score, please see Appendix E.

33. Cycling '74, *Max*, v. 8.5.4, 2023, https://cycling74.com/products/max.

34. Andrea Agostini and Daniele Ghisi, *bach: Computer-aided composition in Max*, 2023, https://forum.ircam.fr/projects/detail/bach-computer-aided-composition-in-max/.

closer to home, the less "desire" it had to move. In the event that it was selected to move, the pitch had an equal chance to move up or down and by one or two half-steps. Thus, the resultant chords would demonstrate a high degree of parsimony in their voice leading; each voice developed its own independent arc depending on its starting position and destination but the sonic whole was one of smooth chord-to-chord motion. Notes which remained in place were always tied together so as to avoid all voices attacking simultaneously with each step.

Many, many instances of the program were run with different initial pitches, destinations, and numbers of iterations in order to find a good balance between motility and stasis and to ensure that a few harmonically noteworthy events jumped out over the course of the piece. *bach* was indispensible in that it allowed each run of the software to be visualized in traditional notation and audiated via MIDI within the patch itself. While I ended up tweaking a small handful of pitches toward the end of the piece in order to accentuate the final harmonic "push," the algorithm required pleasantly little interaction on my part and happily generated ten minutes' or so of material with which to experiment. Reviewing the material allowed me to map the emergent harmonies and the "topography" of tension-and-release which resulted naturally from six voices in aggregate.

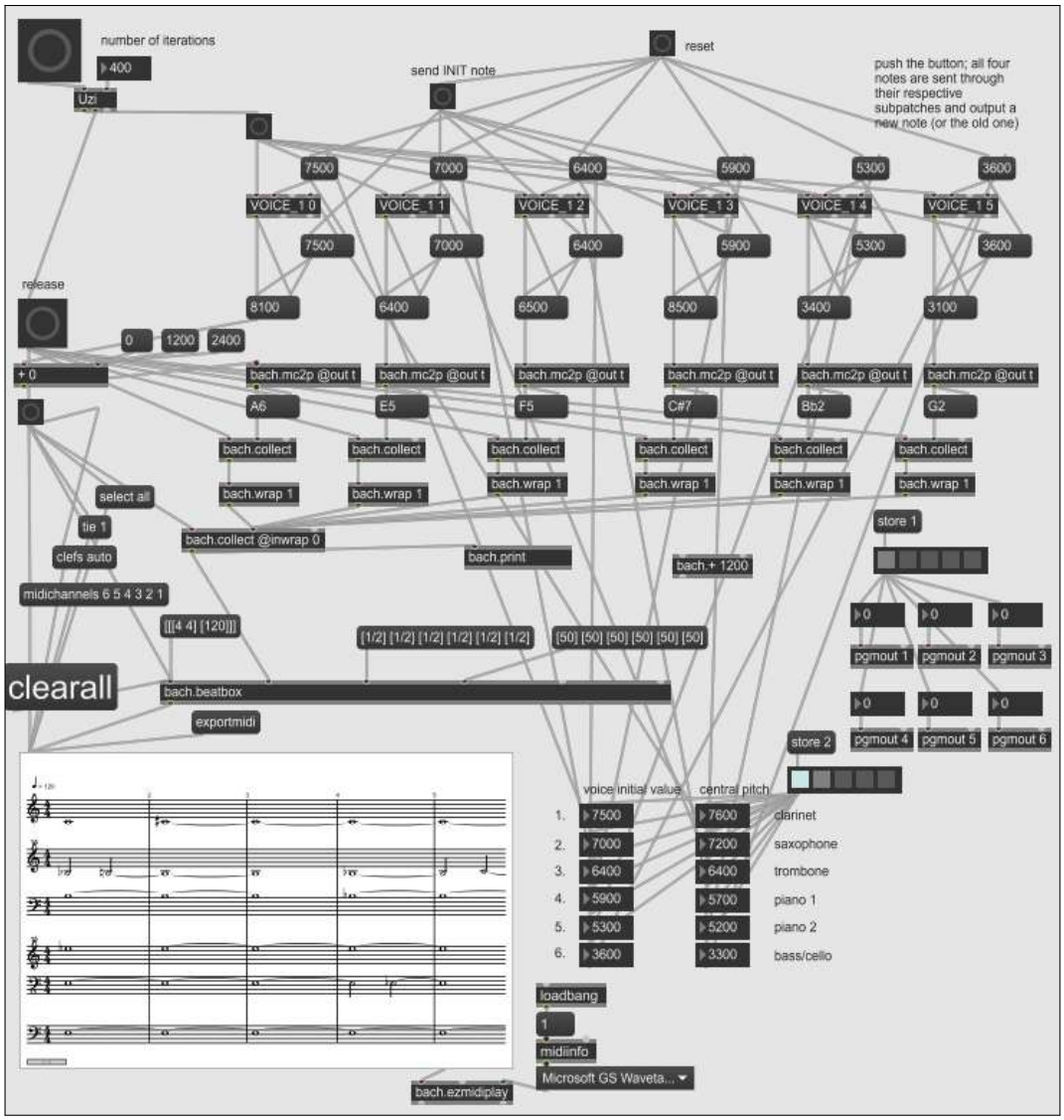


Figure 4.19: Max patch used to generate pre-compositional materials for *Sostanza come il Sangue* with the aid of the *bach* package.

Integrating improvisatory notation proceeded by excising portions of melodic material from a voice or voices and replacing them with bracketed {O-G} gestures. This was done strictly on an intuitive basis; chord members which were of least importance to the emergent harmony (i.e. duplicate pitches, etc.) were most likely to be replaced by new gestures. {O-G} elements were kept to relatively simple forms; used, for instance to add a "micro-improvisatory" texture (microtonal trills, morse topics, etc.) to pitches already present or providing a series of new pitch classes with which to generate a sub-melody. Glyphs which appeared in dashed boxes

were to be performed pitchlessly, e.g. by using only breath or muted strings. Further, players were given the instruction that all improvised elements were meant to be subsumed by the greater harmonic texture—that they should be audible but never dominant. Figure 4.20 gives a typical example of the way bracketed glyphs were incorporated with traditional notation.

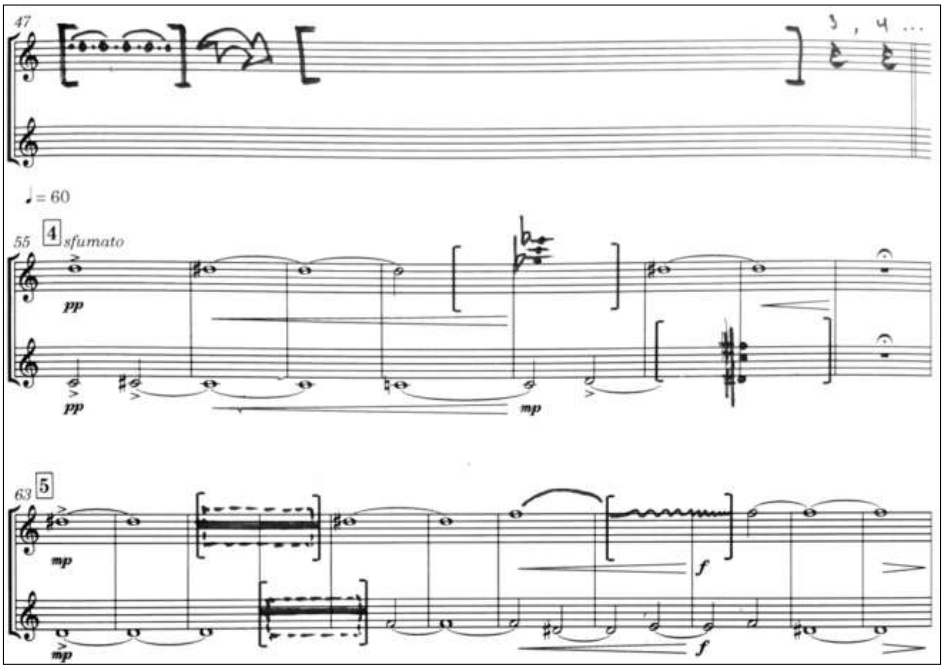


Figure 4.20: Excerpt from *Sostanza come il Sangue* (top: B♭ clarinet, bottom: tenor sax) horn part illustrating integration of traditional notation with {O-G}.

Sostanza... posed an additional challenge in that it was the first work to bring {O-G} into a traditionally-metered context. Performers were challenged to remain aware of their position in the measure while still creatively engaging with the improvisatory directive at hand. This challenge (compounded by limited rehearsal time) was mitigated by including a conductor despite the small ensemble size, as well as by keeping the piece to a comfortable $\frac{4}{4}$ at $\blacklozenge = 60$.

High Structure Carbon Black

High Structure Carbon Black (*HSCB*) was, if not the first, then certainly the best unaccompanied work for {O-G}.[35] This score was unique in that it was written to be performed by its author; allowing for as sophisticated a notational vocabulary as I desired. In the end I opted for a diverse but still relatively uncomplicated roster of novel symbols to focus in more closely on just a few techniques (both standard and extended). At its core, *HSCB* took the form of an abstracted lead-sheet with a simple AABA' form, with performance involving several repetitions of this form. The melody itself was composed wholly intuitively, without regard for particular tonic/dominant relations (though in the end, it tended toward a tonic written A♮).

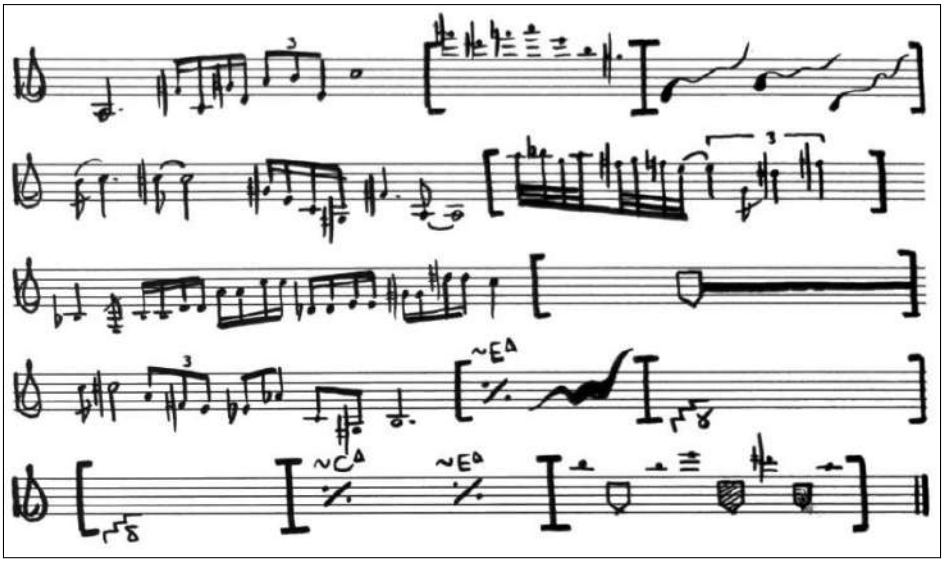


Figure 4.21: Last five systems of *High Structure Carbon Black* (constituting the A' section).

The single line score contained both traditional notation (sans meter, barlines, and modifiers like articulation or dynamics) and bracketed {O-G} glyphs. Borrowing an organization scheme from Rădulescu, material in brackets was organized into loose gestural regions: α gestures involved stemless pitches with which to improvise, γ gestures involved multiphonics, etc. This allowed me to use a class of purely relational gestures such that an empty bracket would be

35. In performance: Isaac Otto—alto saxophone. For complete score, please see Appendix F.

given the relational modifier "build upon α" or "build upon δ" referring back to earlier parts of the score (rather than to other players). Other bracketed gestures included traditional lead sheet symbols (modified with a "$\sim$" glyph), legato phrase curves, and combinations of the above. Given that the bracketed gestures remain unconstrained with regard to duration, *HSCB*'s performer is able to (a) modulate the balance between melodic and more open material and (b) sculpt the work's dramatic arc by changing the length of these gestures as they take additional "choruses."

HSCB functioned as a loose homage to Braxton's early composition methodology: the bracketed gestures incite exploration of specific sound-zones much in the same way as the "language types" aided Braxton in his navigation of the *No. 8* series of compositions on *For Alto*. Limiting the gestural range by only including a few distinct glyphs ensured a general coherence, even in an improvised work that allows considerably more free play than a typical lead-sheet guided performance.

Nemat-Space

Nemat-Space was in some ways the most unconventional (and least systematic) of the entire roster—representing the co-compositional brainchild of performer-composer Niloufar Shiri and myself.[36] Over the course of a number of weeks, Shiri and I improvised under loose or entirely absent constraints using a variety of materials (both musical and technological). Over time the composition settled into a multi-layered approach involving several analog recording devices to augment live performance. Freely improvised material and text were recorded onto four-track, stereo, and microcassette. Where the four-track served as a manipulable background layer upon which we would later improvise, stereo and microcassettes became additional tools in a multi-instrument setup which eventually grew to include AACM-esque "little instruments" as well (birdcalls, tingsha cymbals, aluminum foil, a length of brass chain, etc). Perhaps unsurprisingly given the nature of my work, finding some way to score these

36. In performance: Isaac Otto—winds and electronics, Niloufar Shiri—kamancheh and electronics. For full score (such as it is), please see Appendix G.

efforts was a central concern. By the time development of the work complex was in full swing, I had attempted a number of scoring methods. Figure 4.22 illustrates one such attempt.

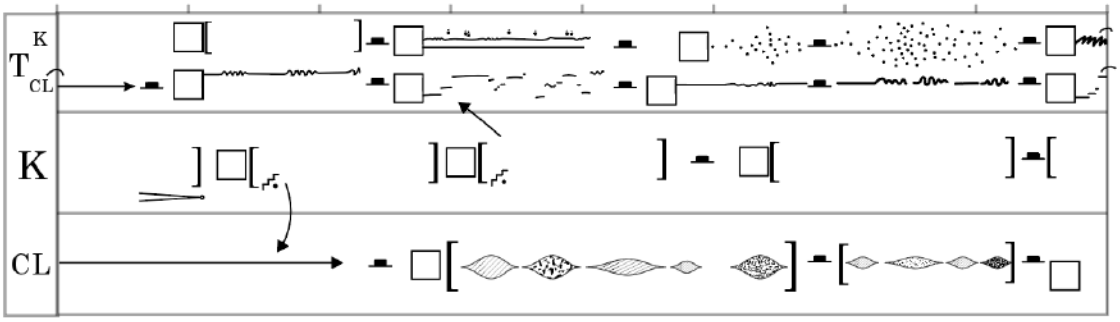


Figure 4.22: Excerpt of an {O-G} transcription of an early version of *Nemat-Space*

Here, I used {O-G} to loosely transcribe events on the four-track tape (first line—marked T^{K}_{CL}). Additional layers were then added which only very loosely constrained live players' gestures (primarily using "build upon" relational symbols). This sparse notation had the benefit of being able to maintain player orientation over the piece's 15-minute duration and gently corral our playing without delimiting our creative contributions too strictly. In addition, I designed a number of interstitial "interlude" scores which would be performed at break-points over the course of the piece. Given that these interludes comprised only one or two gestures each and could easily have been committed to memory, these scores served more as archival documents and/or art-objects than actual performance tools—though they did serve to render this interstitial material far more fixed than the main corpus of the piece itself. Figure 4.23 gives one such interlude comprising a single long pitchless gesture; giving physical parameters of instrument and microphone placement in addition to the usual prescriptions.

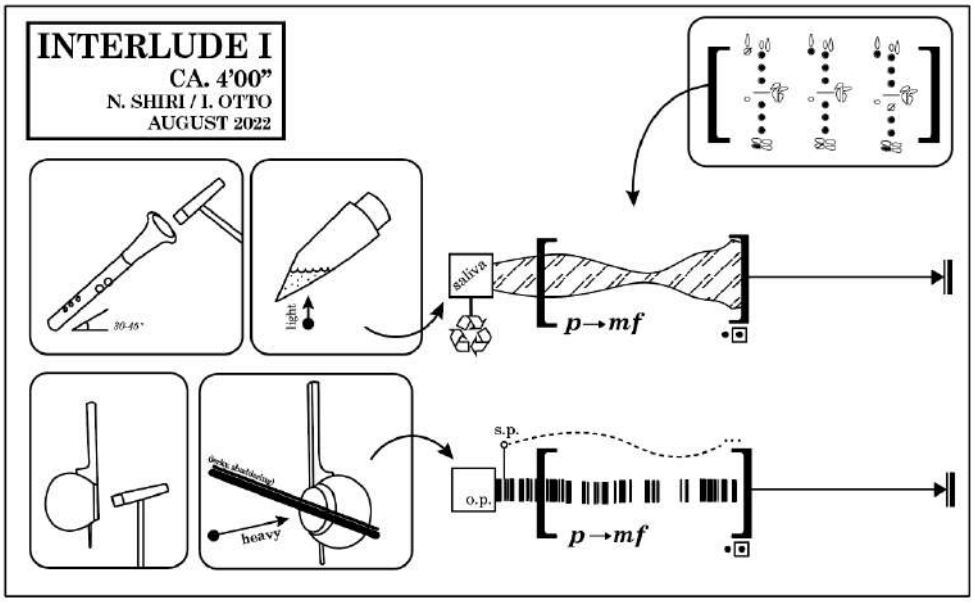


Figure 4.23: Experimental score for an interlude in an early version of *Nemat-Space*.

After a number of trial runs, we settled on a particular setup and recorded what was to serve as the zygotic form of the final concert-ready piece. In the end, the tools, techniques, and sound-concepts had changed enough that the aforementioned score was shelved (perhaps to one day take on a second life elsewhere) and I started work on an entirely new version based on the physical gestures, sounds, and tape-interactions which emerged during this run. The final one-page score (shown enlarged in Appendix G) is given in Figure 4.24.

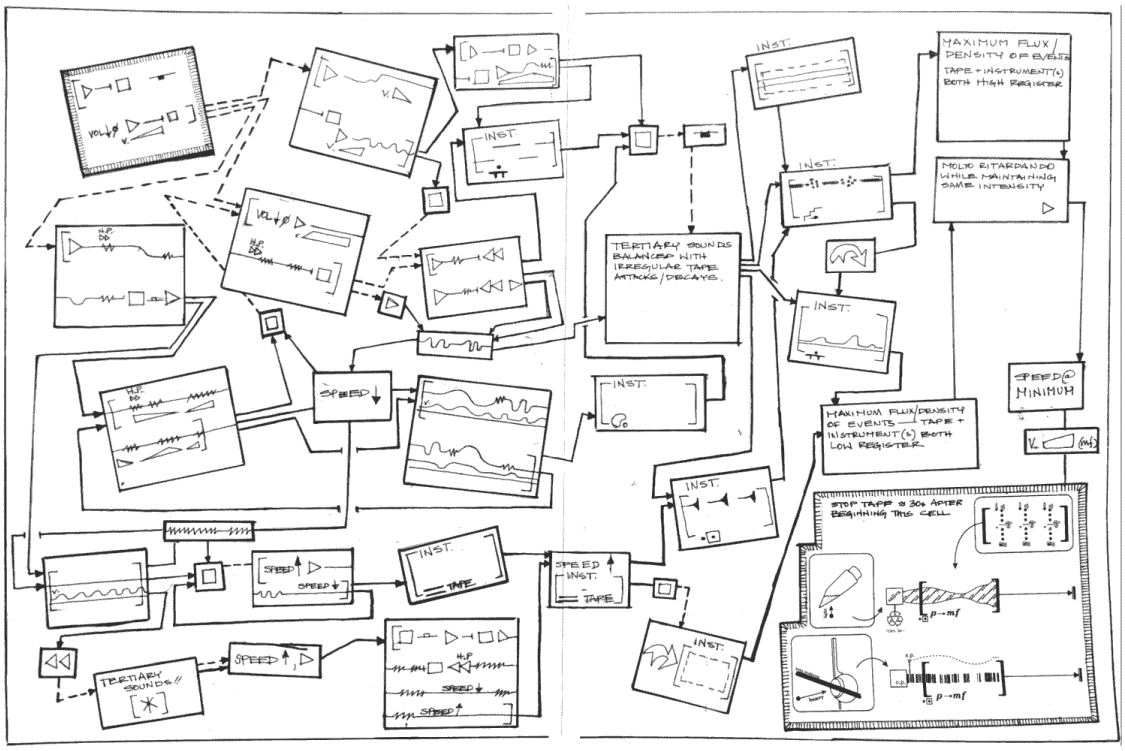


Figure 4.24: Final score for *Nemat-Space*; largely ignored in performance.

It is apparent from a glance that this was not a transcription in the same sense as my earlier efforts. Over the course of the co-composition process, we'd arrived at the conclusion that for the purposes of this work, traditional left-to-right linearity was stifling our ability to remain flexible in performance. With this in mind, I approached this score cellularly; with fixed beginning and ending points (note that the earlier interlude was repurposed to serve as the piece's elongated final dramatic gesture). The score's pathing was devised such that some cells provided many branches to potentially traverse, while others featured only one way in or out. The score remained deliberately open-ended with regard to pacing and total duration. Per the central mechanism of the score, performers could only navigate to cells which were linked by arrows (and only in the direction specified). Here I used simple new glyphs to stand in for gestures relating to the tape mechanism: play, stop, rewind, half-press, speed up and down, etc., which were combined with more familiar {O-G} glyphs. Material was divided into "primary" (gestures performed on one's primary instrument), "secondary" (performed

on tape devices), and "tertiary" (performed on "little instruments"). Where a gesture or parametric constraint was particularly difficult to express in {O-G}, textual directives were employed instead.

While I have refrained so far from commenting extensively on the vagaries of performance (which I'll save for the following section), *Nemat-Space* was a special enough case that it demands some further exegesis: In the end, despite having developed what I thought to be a robust conceptual framework and despite having gone through several revisions in order to meticulously balance in-the-moment creativity with composerly intent, our score was almost entirely ignored during the final performance. Given that this was perhaps the most-rehearsed piece on the bill, we had enjoyed a considerable amount of time to internalize precisely the sorts of gestures which best suited our desired *klangwelt* and the rough arc in which they were to be deployed. Thus, while our beginning and ending points remained fixed and while many of the gestures heard in concert corresponded to elements of the score, the document itself was reduced to a library of techniques; really of *reminders* which had no particular authority over the actual activity on stage. All of the meticulously-designed pathwise movement (besides the large-scale arc from "exclusively tape sounds" to "exclusively instrument sounds") was discarded in favor of an essentially intuitive approach to the piece; sacrificing rigor and reproducibility for a more cogent work which gave itself over entirely to the demands of the here-and-now.

Given that *Nemat-Space* was, to my mind, one of the more successful works on the bill in terms of having attained our desired aesthetic, I consider this an important object-lesson in the broad domain that is writing for improvisers generally. Given that the process began with several sessions of experimentation with techniques and materials, the way in which *Nemat-Space* was co-composed contrasted strongly with the other capstone works which, in a much more traditional sense, left the composer-performer hierarchy intact (albeit modified somewhat). As it turned out, attempting to somehow condense this exploratory ethos to the size of an A3 page and rigorously encode its means of reproduction for an audience was

never the right approach. While, undoubtedly, *Nemat-Space* the *score* could under the right circumstances be read literally, methodically; producing an interesting sound-object in its own right, *Nemat-Space* the *work-concept* seemed to resist encapsulation in this way. This is not to say that such work-concepts remain fundamentally incompatible with the notion of scoring generally; only that rendering the ineffable in pen-and-ink might, on occasion, require a new concept of what actually constitutes a score. Clearly, in this instance, the piece was better-served by allowing that the score comprise a non-exhaustive list of available techniques; a series of symbols which serve more of a mnemonic function than an authoritative one.

4.4 Postmortem and reflection

4.4.1 Further lessons from performance

Of course, this was not the only wisdom waiting to be gleaned from rehearsal and performance. Perhaps unsurprisingly there was a strong correlation between the pieces which had had the luxury of multiple thorough rehearsals and the pieces which worked best in practice. I found that principally, when performances were found to be in some way lacking, our problems had more to do with the rendering of traditionally-notated material rather than that of {O-G} material—e.g. ensemble blending, intonation, "tightness," etc.—and aren't particularly pertinent to an evaluation of compositional aesthetics or {O-G}'s efficacy. Speaking generally, performers were only very rarely unclear as to the parameters constraining improvisation in any particular series of glyphs. However, I did observe an interesting (though not unforseeable) phenomenon whereby players would begin a piece's first rehearsal by rendering gestures (whether bracketed or unbracketed) quite literally despite the creative liberty the symbols were intended to afford. As they grew more comfortable with the material, however, interpretations of bracketed materials began to tend toward greater variability from run to run even without my direct intervention; the lesson being that to a certain degree no amount of specificity of

directive can replace practical experience on the bandstand.

There were only a very small number of occasions where during a player's rendering of an {O-G} gesture I observed such a discrepancy between my initial sound-concept and the resultant sound that I felt the need to intervene and clarify precisely what I was looking for. Of course, that these mismatches were not more frequent is as much a testament to the skill of the musicians involved and the bond we'd developed over the (in most cases) several years of performing together as it is to the communicativity of the notation. Nevertheless, I think they merit comment: As I see it, these instances do not reflect some deficiency in the notation scheme or how it is implemented so much as they indicate that reading {O-G} can actually be remarkably similar to reading traditional notation. In both cases, during the rehearsal process it is the composer's responsibility to take into account the way performers engage with the written work and amend or clarify as needed such that a balance is achieved between authorial intent and player expectation and ability.

Another key observation was that the pieces' notational structure effected a profound impact on performance phenomenology. By and large, the performers I'd selected for the concert were skilled in musical literacy as much if not more as they were in various forms of improvisation. Despite this, where scores were more open-ended with regard to how and when {O-G} was to be read, performers seemed to have a much easier time interpreting the notation creatively. Conversely, scenarios where {O-G} was constrained by tempo or time stamp, gestures tended to be more dry and literal. As an interpreter myself, I can attest to perceiving two distinct phenomenological modes here. When confronted with floating glyphs which remain temporally untethered, the symbols' gestural content seems to occupy a sort of mental "memory buffer." During play, one has the luxury of waiting (consciously or unconsciously) for the aesthetically most opportune moment to pull them from this "buffer" and deploy them when needed. This extends as well to permuting—stretching or squashing—these gestures to best fit the musical moment. This requires a very different sort of creativity than scenarios where a glyph is to be rendered precisely between, say, 2'30" and 2'35". In this

latter case, heeding the score's demands seems to take mental precedence over fulfilling some aesthetically-necessary creative impulse; as a result, glyphs are seemingly paradoxically easier to read verbatim (or as close to verbatim as one can achieve under this scheme). I take it that this discrepancy, too, might be exacerbated by limited rehearsal, and that over time even these time-locked gestures could begin to breathe with the same fluidity as more open ones. Nevertheless; given that time is always a luxury for musicians of any sort, these perceptual differences are worth certainly worth bearing in mind for any composer-for-improvisers.

4.4.2 Reflections on {O-G}

Over the course of the project's design and implementation, I considered five primary criteria with which to evaluate the notation's efficacy. To wit:

1. *Ease of acquisition*—i.e. How much trouble did the performer have in learning and adapting to unfamiliar notation? Were there too many moving parts or was the learning curve shallow enough that the players felt that they could meaningfully contribute after sufficient rehearsal?
2. *Clarity of intent*—i.e. Was it clear pre-rehearsal what the composer was looking for regarding each player's contribution to the music? Or did it only become clear after several grueling hours of hashing-out during rehearsal?
3. *Engagement with structures of fixity/openness*—i.e. Did the performers find that they could make a clear musical distinction between "more fixed" and "more open" material and use that to the music's benefit?
4. *Subjective quality of the final product*—i.e. How engaging or musically stimulating was the performance practice itself? Was the music any good? Or at the very least interesting?
5. *Novelty*—i.e. Did we achieve something that would, in some way, be closed off to "pure" open improvisation or to other methods of scoring?

Upon reflection, {O-G} passed #1., 4., and 5., with distinction. Over the three or so years spent working on the project, as much time (if not more) was spent developing the system's minutiae and "casting them in stone," as it were, in the form of the instruction manual than was spent composing and revising the creative works. Focusing so much of my effort on the clarity and consistency of the encoding scheme virtually ensured that performers would

find the acquisition of this new "language" easy compared to rehearsing and performing the actual music. Performer feedback here was in essence universally positive; with {O-G} being favorably compared to other, one-off systems of notation. The tradeoff here was that this focus on symbolic economy and readability foreclosed certain creative avenues: as deployed, the notation (without some rather severe additions or amendments) could really only be so precise without defeating the spirit of the system. As such, the chosen notation served to "color" the compositions in certain ways; simplifying them perhaps, in ways that would not occur to me had I attempted to encode my sound- or process-concepts in traditional notation.

In terms of subjective quality of the final product: I consider it the part of the musician's burden to never be fully satisfied with the results of a performance; especially one featuring one's own compositions. There were several instances where I felt that just one or two more run-throughs might have fixed stubborn issues with synchrony or intonation which inevitably pulled attention away from the often stellar creativity on display. However, informal audience polls yielded prevailingly positive responses, especially for pieces where {O-G} was featured more front-and-center (i.e. in *W/M*, *Q-Tet*, and the like) and was not in any way compromised by efforts to combine it with structures of traditional notation. The players, too, reported feeling challenged and generally more mentally engaged when confronted with the new scheme than they might feel under other improvisatory modes of play. As desired, the central kernel of the experience for players seemed to be in developing a personal sense of balance between creation and recitation. Most of the music's relative simplicity allowed players the space to cultivate this balance rather than devote precious practice time to the execution of precisely-notated complex phrases. Of course, this, too, came at an obvious cost: several pieces were left on the cutting-room floor owing to their complexity, length or difficulty; compositions which could have served to demonstrate even further creative range. Fortunately, not every goal need be met in a single concert; in the future, more focused creative efforts (say, using exclusively the lead-sheet model of composition as a vehicle for further {O-G} development) might pick up where this left off.

"Novelty," too, I think was an easy win. It is known (at least in the various improv circles of which I've considered myself a member) that as the size of the improvising ensemble increases, so too do the odds that any given open improvisation will inevitably fall prey to a kind of "curse of the swell." This is an (unfortunately? amusingly?) common trope whereby the only noteworthy structural feature of an improvised piece is its slow, large-scale crescendos and decrescendos—by far the easiest sonic features for less experienced improvisers to latch onto and complement. In a certain sense, so long as {O-G} was able to circumvent the curse of the swell by facilitating more nuanced and interesting structural features, I would have counted it as a success. An undeniable strength of the scheme is that even barely-constrained improvisation denoted primarily by empty brackets can (via the use of changing player simultaneity and judicious use of cues) be used to develop compelling structures. While novel structure was never the primary focus of my compositional efforts for the capstone, I take it that at the very least these pieces were able to achieve structures impossible under open improvisation and at least difficult to achieve by other means of music notation.

Success in "clarity of intent" is a little more difficult to assess. As described above, feedback during rehearsal and after performance skewed very positive with performers reporting little confusion and a general ease of translation from glyph to sound or gesture. The waters are muddied, however, by the mere fact that, often, a composer's driving sound-concept might change drastically from point of conception to point of execution. It is inevitable (indeed even something to be embraced) that via the idiosyncrasies of collaborative music-making, performer output feeds back into composer input in such a way that it is very difficult to pin down any one operant sound concept. In one scenario a 'cello gesture imagined at time of writing and inscribed in {O-G} might be revealed in rehearsal to be far too quiet, too physically demanding, or aesthetically clumsy in context, and might therefore be edited to reflect an updated sound-concept.

Another scenario, though, might see the 'cellist interpret the gesture in a manner wholly unforeseen by the composer, but in a way that unquestionably suits the context in which it

was improvised. Here, despite the fact that the composer's initial inscription lacked clarity to the point that the text was "misinterpreted," the gesture (and therefore the piece) is granted new vitality. This, I take it, is the sort of co-compositional artifact composers ought to covet: an instance where the performer's contribution is more elegant and appropriate to context than anything intended by the composer. As a sometimes over-lenient composer myself, I found that this phenomenon became practically *de règle* in the rehearsals leading up to the capstone concert; so much so that it becomes difficult in retrospect to assess the extent to which the initial sound- or process-concepts survived unscathed. This was of course compounded further by the (potentially paradoxical) policy I took toward "rule-breaking" documented in the instruction manual (and in subsection 4.3.1) which encourages, above all else, honoring the aesthetic demands of the music even at the expense of fidelity to the original document. As such, I suspect my initial criterion was malformed: unbiased evaluation of {O-G}'s ability to retain and convey the many parameters of a composer's sound-concept remains elusive practically by necessity. The moral of the story, it seems, is that to amend the system such that all notational ambiguity might be stripped away would also be to excise the aspects that allow for co-composition proper, and at best would result in a poor facsimile of traditional notation.

Lastly, evaluating "fixity/openness engagement" requires some special consideration as well. Of my capstone players, precisely none had ever been tasked with absorbing quite so elaborate a set of performance rules and regulations in advance of a concert. Though I'd made my goal of directly modulating perception of gestural fixity/openness clear from the outset, and though each of my performers had had many years of experience in both creative and re-creative music-making paradigms, players' ability to internalize my intended fine- or coarse-grained distinctions between "more fixed" and "more open" gestures varied considerably across the ensemble. So, too, did player response to the manual itself.

As our schedules, unfortunately, did not permit a formal introduction to the system in a classroom setting, the manual was delivered with the basic instruction to read and absorb

as much as possible prior to the first rehearsal. Some players took to the idea immediately; finding the manual's granular detail and focus on robust definitions reassuring in the face of the task at hand. One performer, a long-time improviser but one more at home with scored music (Western classical, commercial, jazz) was quite liberal with marginalia; taking time to graphically and textually map {O-G} onto more familiar concepts—even for those signs which did not directly involve her instrument. Unsurprisingly, this player was also one of the most vocal in requesting clarification of more loosely-defined glyphs; feedback which proved invaluable for future revisions. Other players were much more lax with regard to this pedagogical component, preferring to skim the book and save any relevant inquiries for the rehearsal studio. Overall, it was this latter group who seemed to approach the symbols' fixity with the most *laissez-faire* attitude; leaning toward one mode of play over another for the majority of their interpretations.

Beyond the semi-structured pedagogy of the manual, aspects of the pieces, too, had a significant impact on the way players encountered structures of fixity and openness in notation. Another player (one quite well-versed in jazz performance practice and, while a competent reader, only rarely a performer of scored music) perused the manual as requested, but gleaned more about the use and function of the system via one-on-one conversations with its author. When asked for comment, he explained that interpreting {O-G} tended to be more of an intuitive process. If a particular passage was singled out, he had no trouble distinguishing between, say the fixed central gesture in *Q-Tet* and the more-open peripheral gestures—but in general, bracketed and unbracketed gestures tended to float between more- or less-fixed depending on the moment-to-moment context. However, he did note that a work's sound and structure had the ability to mediate his experience of notational fixity. With regard to *Modular XV*,[37] another mixed-notation piece which combined a lead-sheet-style piece (composed much earlier) with a grafted-on layer of {O-G}, he expressed that the piece's "classical" linearity and its more solemn, hymnic sound-world inspired a more by-the-books

37. In performance: Isaac Otto—bass clarinet and processing, Collin Felter—trombone, Atticus Reynolds—trap kit.

approach to the notation compared to the more freewheeling *Q-Tet*.

Naturally the two players who'd had prior experience with the system (albeit in the earlier form used for *Device...*) enjoyed a much shallower learning curve than the rest of the ensemble. One of these two (*W/M*'s drummer) went above and beyond in service of rendering the piece's (predominantly more-fixed) gestures as faithfully as possible. Given that the score only provided generic pitch contours without specifying particular drums for particular ranges, this player took the time to pencil in pitch bands to correspond with his preferred setup; keeping to these bands in performance as strictly as possible given time and rehearsal constraints. For this player, to be tasked with performing a scored work was to take on a significant degree of responsibility. For him, treating fixed gestures with anything less than this level of commitment would be an incomplete or inexact realization of the score.

If we formulate the current question as "Was {O-G} successful in communicating gestures' intended degree of fixity or openness?" then the only way to arrive at a satisfactory answer would be to approach things scientifically; running dozens of trials and systematically identifying regions of greatest and least sonic variability from run to run in order to compare them to the glyphs' denotative content—an untenable solution given time and budget constraints. In light of the above testimonials and observed interactions with the notation, however, two things become clear: (1) Each player was able to draw meaningful distinctions between the variously-fixed symbols and use them to the works' creative advantage but ultimately (2) the downstream musical results of these distinctions and their perceived priority in the context of the work is *highly* contingent on a number of factors including the performers' musical backgrounds; their general attitude toward scored works; their reading skills; even their experiences of the piece's sound-world itself.

Under a critical reading, {O-G} succeeded as a tool for improved composer-performer communications only insofar as it was developed and deployed in a very particular musico-social context. The musicians who came to be the core audience for the system were, to a man, good friends and colleagues with whom I'd had extensive prior musical experiences.

They were chosen specifically because they were fit to purpose, i.e. because I was aware of their particular orientations toward scored and/or improvised musical materials and because I knew they would take well to unfamiliar scores; treating the music with curiosity and respect. Developing the system past its nascence would mean not only expanding its library of symbols to encompass more musical territory (symbols for organists, electronicists, singers, dancers; finer control of relational parameters; more robust cuing system) but would also mean ensuring its efficacy beyond those musicians with whom I already have a rapport; extending it to new groups of (current or would-be) improvisers—"pure"-readers, non-readers, young students—such that they might compose *or* perform using {O-G}. To be sure, getting to this point would require a great deal more inter-practice collaboration and would pose more of a challenge than (in essence) unilaterally dreaming up a library of functional glyphs and presenting them to the ideal performers. The results of the concert, I think, evince the fact that with very few changes, {O-G} has the potential to be a robust compositional tool for improvising musicians of a certain bent—and to a certain extent this is plenty. Really, thoroughly fulfilling the system's original raison-d'être though (i.e., more broadly facilitating composer-improviser communication; bringing together diverse paradigms of musical writing) would mean taking on this greater task.

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APPENDIX A

ON THE USE AND INTERPRETATION OF OTTO-GLYPHS

ON THE USE and INTERPRETATION of OTTO-GLYPHS

ISAAC OTTO

ON THE USE AND INTERPRETATION OF OTTO-GLYPHS:

A BRIEF PRIMER ON
A NOVEL NOTATION SCHEME
FOR IMPROVISING MUSICIANS

ISAAC OTTO

OCT. 2023 V.1.2

Contents

Chapter 1

Introduction

Fair warning: this introduction is somewhat wordy and boring. For those who might like to skip straight to the meat of the matter—descriptions of the glyphs themselves begin in **Chapter Two**. For the rest of you, please allow the following diversion into the impetus behind this project.

What is this manual attempting to do?

This small booklet is intended to serve as a general primer introducing performers to a still-developing style of music notation. As much as is possible, I will attempt to spare the reader from paragraphs of "manifesto"-style pontificating on the whys and wherefores of improvisatory notation and get right to the point: learning to interpret these novel glyphs in the context of a performance. Having said this: if you'll permit me, I'll begin with a brief explanation of the motivation behind the "system," followed by illustrated definitions and contextual examples of the various glyphs which make up its fundamental units. These are organized from most generally-applicable to most specific. Crucially, this is an *ongoing project*. Symbols are apt to change, be added, subtracted, and refined as is deemed necessary for each new piece. This booklet is a snapshot of the state of the project as of Spring 2023 but may (and ought to!) change as rehearsal and performance reveal new desiderata.

Connotative/denotative notation schemes

how it feels vs. what it says

In the realm of "graphic" notation (or, as I prefer, "neonotation") there are, broadly considered, two sometimes-intersecting modes of performer engagement: "connotative" and "denotative" notation schemes. **Connotative** notation is what I imagine most would think of when the term "graphic notation" is mentioned. Perhaps the ur-example of connotative notation is Cornelius Cardew's *Treatise* (1963-67): a sprawling, 193-page score featuring evocatively

transfigured staff lines, stems, and beams; stretched nearly beyond recognition into undulating patterned dots, curves, and geometric figures. Famously, Cardew provided no concrete rule-set to facilitate the interpretation of these glyphs. Rather, performers were forced to rely on the connotative content of the symbols themselves to inform their performance tactics—thereby rendering each interpretation a wholly unique "translation" of the visual artifact of the score. While Cardew's intent was not necessarily to score *for improvisers*, many 21st-century improv-focused composers take the same tack when crafting their works.

On the other hand, there exist a small number of more-or-less well-defined **denotative** notation schemes which imbue their symbols ("graphic" or otherwise) with enough semantic content that a performer can consistently interpret them from performance to performance. Of these, traditional notation is by far the most prevalent (if trivial) example. However, some recent composers have developed as part of their compositional practice new, robust notational symbologies which have the ability to—for instance—stand in for otherwise unwieldy traditional notation or to constrain the sonic output of improvising musicians (Horatiu Radulescu's "little devils" and Anthony Braxton's "Language Music" scheme jump to mind). The fledgling system I describe here is decidedly of this latter category.

Of course, in practice, no system of notation is ever *wholly* connotative or denotative. Since notational symbols are invariably designed to be interpreted by human beings, even the most spartan set of symbols will convey some "extra-semantic" meaning over the course of their reading. An angrily-scrawled four-bar passage of quarter-notes has the potential to impart a decidedly different "flavor" to the performer (and thereby to the audience) than one that has been delicately engraved on copper plates. As such, a composer who wields a system of graphic notation must always take care to consider potential connotative interpretations of his/her marks on the page.

What this notation is NOT:

This notation is decidedly *not* an attempt to replicate the function of traditional notation. There have been, over the past hundred years or so, several systems which purport to improve upon the venerable five-line staff and its finicky stems, beams, and accidentals. Approaches include giving each chromatic half step 1/12 of a four-line staff[1] or switching over to "stacks" of six-line octaves[2] in order to do away with flats and sharps entirely. While these may be of some interest to pedagogical min-maxers, traditional notation is, at the end of the day, plenty good enough for its intended purpose.

Neither, crucially, is this notation a means of ensuring perfect sonic fidelity from performance to performance. While I have no doubt that one could devise a novel, "semantically weighty" system of graphic notation which could account for the spectral content of any conceivable sound and thus offer perfect sonic reproducibility, such a Borgesian project would inevitably fail as a notation insofar as the frailty of human perception and recall would stymie its interpretation.

Certainly, the notation I'm proposing here has the ability to, at times, render sonic events in quite fine detail. Ultimately, though, this is a notation oriented toward improvisation first and foremost. As such, there is a built-in promise of some degree of (to use a loaded term) indeterminacy inherent in any work that employs it—a weakness to be devoutly embraced!

What this notation IS:

Given that we have at our disposal a perfectly serviceable system of extant music notation with which to express our sound- and process-concepts as composers, why burden

[1] See "Dodeka Notation."

[2] Various systems shown at `https://musicnotation.org/systems/`.

already-stressed musicians with the responsibility of learning a new set of symbols?

Without doubt, any improvising musician who regularly collaborates with others has experienced a breakdown in communication between some composer (i.e. whoever happens to be tasked with organizing sounds on the bandstand) and the musicians interpreting their desires. The composer may have given only coarse verbal instructions, or they may have drawn a number of evocative, undulating shapes on the page as a source of inspiration—but whatever the case, they feel that their interpreters (being insufficiently clairvoyant) have failed to realize the sound-world they sought to bring about using these methods. At this juncture, barring re-writes, often the only recourse is a sort of fumbling, inadequate descriptive language which may eventually coax a more agreeable performance from the improvisers: "a little prettier;" "pointillist here, then legato;" "kinda like that thing you did last week."

In short, the symbols I lay out here are one means of more clearly communicating the particulars of where and in what way improvisation ought to take place over the course of a composed work. In addition, they serve, for me, as:

- a means of creatively "sculpting" (or "constraining," if you like) the broader space of improvisatory potential;
- a means of capturing the gestural essentials of a piece of music, either via transcription or composition;
- a means of manipulating *gestural fixity itself* as an independent variable—a way of deliberately scrapping the "fixed" music/"open" music binary.

These are, of course, weighty claims which ultimately mean very little without clearly delineated examples; many, many of which will come shortly.

Conducted improvisation v. Otto-Glyphs

Many readers will, no doubt, be familiar with at least one of the two popular conducted improvisation methodologies: Butch Morris' "Conduction" and Walter Thompson's "Soundpainting". To be clear, I will not do these twin systems the justice they deserve by fully explicating their various strengths here. For our purposes, it suffices to say that both systems (which I'll generically lump together as lower-case-c "conduction" practices) achieve in real-time many of the tasks I hope to accomplish on the page. To wit: these systems (despite a fascinating measure of ideological opposition between them which I'll explore in some depth in my forthcoming dissertation) both employ a similar demi-hierarchic structure. A "conductor" or "soundpainter" faces their ensemble and employs a series of predetermined or improvised hand (etc.) gestures which serve as both compulsions to act and as modifiers for said action. One gesture might gently proffer an empty sonic canvas on which a performer might compose—another might radically reduce the improvisatory materials available to a player—a third might force one player's gesture to supervene on another. This polysemic quasi-notation is, in this way, distinct among notations. With a few notable exceptions, notation typically assumes that performance "begins" with the null set ($\emptyset$). Traditional notational markings conjure sound from the void; without them, there is only silence. Conduction and Soundpainting certainly have the capacity to function similarly: fine-grained hand gestures exist which may serve to specify particular pitch classes, rhythms, tempi, etcetera. Their radical difference, however, is their ability to bring about the opposite condition (with the wave of a hand, no less!): the composer's medium becomes the set-of-all-sets. That is to say, when the performer is invited to improvise "freely," the composer acts by paring down this now-expanded horizon of sonic potential. We might imagine the difference-in-kind between the sculptor who shapes a clay vessel—*ex nihilo*—by accretion, and the one who—*ex omnis*—

pares down a block of alabaster which contains the potential for *all forms*. Conducted improvisation has the unique ability to, in real time, oscillate between and combine these two creative paradigms. In short, this creative synthesis is similiarly the burning core of my project.

So, again, given that these comparatively successful means of corralling improvisers already exist, why go through the hassle of developing a novel system which, at its heart, strives toward many of the same goals (i.e. the potential for radical co-composition/hierarchic disruption, top down manipulation of improvisatory gesture)? In essence, the trade-off is this: in exchange for the (considerable) richness and flexibility that comes with real-time organization, we gain, in my work, a certain kind of reified musical artifact—one which lends itself far better to archiving; to careful study; to pre-performance inter-musician negotiation. For what it's worth, we gain, too, a visual object; potentially beautiful in its own right. Finally, we gain an organizational structure which facilitates hybridization with the many extant forms of two-dimensional musical notation.

Thus, if the friendly reader is having trouble coming to grips with the general contours of my motivations, it may behoove them to consider this an extension of the intellectual tradition but forward by Morris/Thomson—only committed to paper. In lieu of a real-time participant, the composer (barring his direct musical contribution as an instrumentalist) is relegated to his traditional, silent role; merely setting an elaborate stage for future dialectical collaboration.

Priorities

the importance of disobedience

Before delving into the specifics that you, the musician, will encounter on the page, I would like to offer one final qualification which hopefully sheds some light on my priorities:

Any simple, flexible system of notation such as the one I've sought to realize here could certainly be deployed to suit

a wide variety of musical/procedural aims. Indeed, it is conceivable that one might, given the right inclination, use this open notation to merely reproduce the traditional composer-over-performer hierarchic paradigm. My goal, however, is precisely the opposite: to build upon the ethos inherent in improvised musics which emphasize co-composition and the **primacy of the moment**.

That is to say: in performance, musical situations will inevitably arise which seem to demand a gestural contribution that runs counter to what is "prescribed" in the notation. Perhaps the prescribed dynamic is far too timid for the latent energy of the passage; perhaps a sudden rim shot on the floor tom would propel the music into beautiful new territory—a situation unforeseeable prior to performance. As I conceive of it, the primacy of the moment-in-performance **demands** that the player heed these calls by making a contribution which deliberately "disobeys" that which has been laid out by the composer ahead of time. The notation has already "done its job," so to speak, by sculpting the perceived boundaries of improvisation—it is still incumbent upon *performers* to make the music. I trust the good taste and musical sense of the performer over my prescriptive compositional ability any day. Thus, the performer should allow her in-the-moment judgements to supplement and/or override notational prescriptions should the music demand it. Improvised music is decisively a quasi-democratic pursuit—performers should not be shy about *improvising their musico-social roles* as well as the music itself.

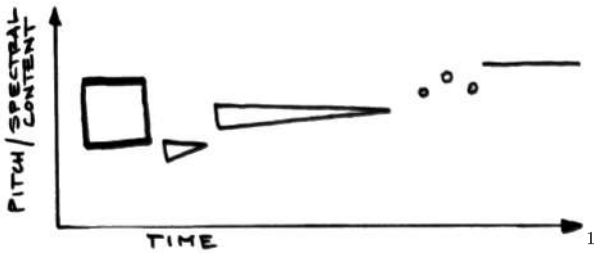
Now: without any more delay, let's talk about what will show up on the page.

Chapter 2

Global concepts; all-purpose glyphs

Axes

THE TERRITORY UPON WHICH WE ORGANIZE GESTURE



Groups of glyphs are read in what I take to be the most intuitive, natural direction for performers accustomed to traditional notation schemes. Predictably, our x-axis is time, which advances from left to right. Time may be encoded in different ways to suit the needs of the piece. In some instances, precise second-to-second changes are specified and are duly marked with time-stamps—necessitating the use of a timekeeping device or more familiarity with the flow of the piece. More often, however, time proceeds "proportionally," whereby the duration of a gesture is only indicated in relation to the overall length of the group of gestures on the page. Performance situations will dictate how long a (for example) two-centimeter-long gesture takes to execute, but as a general rule, a one-centimeter-long gesture should take around half as long. For more information, consult Section 2.2 (**Duration**).

The y-axis encodes "pitch range," or, if you like, "range of spectral content" which is mapped to the parameters of one's instrument (tempered, of course, by the musician's ability and desires). Generally speaking, glyphs toward the top of the specified territory symbolize higher pitch or spectral content while those toward the bottom symbolize lower frequencies.

[1]When deemed necessary, I will include italic "translations" of the given figures into plain English for reference. In this case, we have *two **sfzp** attacks followed by three **p** staccato attacks and a single **pp** attack.*

Axes are, of course, not shown on the page but are to be assumed to hold at all times unless otherwise specified.

A note about pitch height

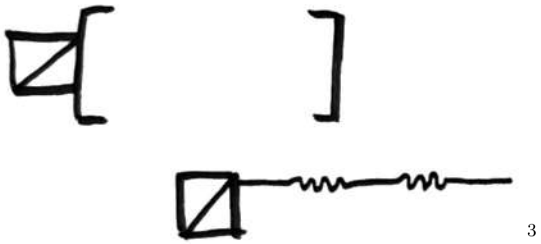
One might reasonably wonder what degree of precision is expected when it comes to interpreting pitch height or (more precisely) pitch *differential* between two glyphs. In short, the system is not set up by default to reproduce precise intervals between attacks. Thus, I find that the best way of interpreting a changing pitch contour is to categorize changes in pitch according to a simple **"same pitch," "slightly higher/lower," "much higher/lower"** rubric. Again, creativity takes precedence over the rigors of reproduction. Loose observation of contour is sufficient to realize most desired gestures here. If more precision is required, traditional notation would probably be a better choice.

Duration

proportional vs. measured

The duration of a given gesture or individual glyph can be represented in three different ways: **proportionally**, using **time stamps** or using **traditional rhythmic values**. By far the most common method under this scheme is to approach duration *loosely* proportionally. Unlike strict proportional notation where the length of a note (gesture, etc.) on the page has a direct one-to-one correlation with the length of the resulting sound[2], under this scheme durational stretching and squashing is left up to the performer.

This is all fine and good for unaccompanied performance, but the problem is complicated by the addition of multiple players who desire some form of synchrony between them. In the context of a duo, trio, etc., proportional durations tend to hold more strictly—though there is, of course, still a good deal of leeway inherent in the system.



3

In the above example, given that there is no additional information present, the precise duration of the bracketed figure is negotiated in real time by Player One (empty bracket) and Player Two (trilling single pitch). Player Two in effect determines the midpoint of the gesture by deciding when to enter. Upon Player Two's entry, Player One then has a strong

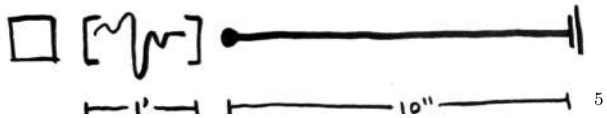
[2]See, for instance, Berio's original manuscript for *Sequenza I* for unaccompanied flute.

[3]*P1 plays open; P2 plays a single pitch which is interrupted by trills*

hint as to when she should conclude her improvisation. This style of notation, of course, works best in small ensembles and when the composer prioritizes performer input and coordination over maximum replicability from performance to performance.

4

When more precision is desired/required, concrete duration markers may be used to indicate the length of a particular sound/gesture. Depending on how fine-grained these marks are, though, a timekeeping device may become necessary for successful rehearsal or performance—certainly a double-edged sword.



5

Of course, there is no law stating that the spatial proportions of the glyphs need correspond with the temporal proportions of the sounds they represent. The above graphic illustrates an unexpected arrangement: a small improvised glyph is meant to last for a full minute while the "longer" single pitch which follows is a scant 10 seconds[6]. Here, the onus is on the performer to determine the best way to translate

[4]*develop something like this arpeggiated gesture for thirty seconds*

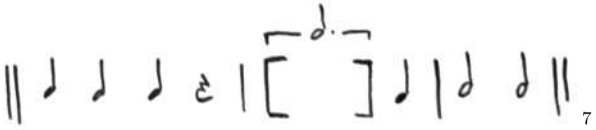
[5]*play in-this-manner legato passage for one minute followed by a single tone (**sfzp**) for ten seconds*

[6]This is perhaps not "best practices" when it comes to engraving technique—but it is decidedly possible. The physical realities of the score-artifact sometimes necessitate creative solutions.

the small amount of information given in the first glyph into one minute of sound.

Lastly, duration may be measured according to traditional rhythmic values (𝅗𝅥, ♩, ♪). Glyphs lend themselves to being embedded in traditional notation quite easily—as such, one might find improvisatory gestures occupying staves alongside traditional figures.

Here, context tells us that the empty set of brackets occupies one full measure of $\frac{4}{4}$. Predictably, the composer sacrifices creative leeway here for metric precision. Further, labels may aid in specifying the precise duration of a figure in a rhythmic context, as in the figure below.


7

[7] *open improvisation for a fixed duration (a dotted half-note) in the context of a metric grid*

The box

GESTURE-SCULPTING PARAMETERS


8

9

10

The **box** (sometimes **box-with-a-slash**) which precedes gestural glyphs serves as a sort of combined "clef" and "key signature" which may contain modifiers affecting the following gestures. Sometimes its presence merely indicates the beginning of a new group of gestures or a new sound- or process-concept and is thus left empty.

In the case of the box-with-a-slash, the **northwest** corner tends to be reserved for parameters which constrain pitch content (e.g. lead sheet symbols like **E♭Δ♯11**, mode indications like **G Dorian**, or other, more specialized marks[11]. Specific indications here should be spelled out specifically in the performance notes from piece to piece. The **southeast** corner, on the other hand, is usually used for modifiers which will change in degree or intensity over the course of the gesture group (e.g. amount of air in the sound, amount of "growl," degree of *sul ponticello*, mute position, etc.). For more information see Section 2.9 (**Lollipops**).

[8] *empty box; no indications*

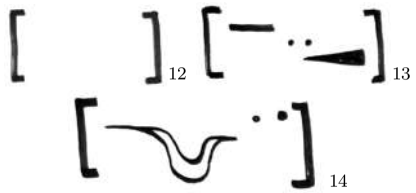
[9] *play what follows over [imagined] A♭ major chord*

[10] *the amount of air in your tone will change over the course of this gesture*

[11] In the past I have used **XXIV** to indicate the incorporation of the 24-tone equal-tempered scale—i.e. quarter-tones.

Bracket notation

A means of modifying gesture's fixity



Simple **brackets** are one of our most valuable tools for sculpting an improvised performance. The difference between an un-bracketed and a bracketed gesture is subtle, but makes all the difference in the world. In essence: any time brackets appear, they should be read as: **play something *in this manner***. How precisely ***in this manner*** is interpreted will of course differ greatly between performers. For instance: Where this figure...

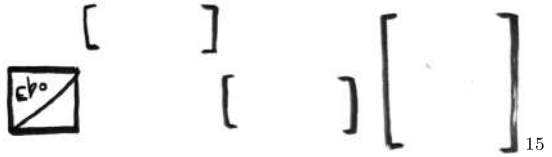
indicates *three short attacks and a brief legato passage* across a particular duration, its bracketed counterpart

asks the performer to play using these *sorts of* gestures for the duration indicated by the brackets/arrows. Rather than specify certain sounds in certain orders, the bracketed gesture gives a player a sort of "sonic territory" to occupy for a given

[12] *open improvisation*
[13] *play something like this combination of attacks*
[14] *ibid.*

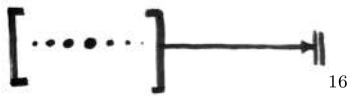
time. The player ought to feel more "freedom" with respect to the execution of the material therein than with the more cut-and-dry plain gestures.

Occasionally a player might run across **empty brackets**. These serve to indicate that improvisation is essentially unrestricted (except with respect to total duration). Exceptions occur when the empty brackets span only part of the vertical axis...



which suggest open improvisation emphasizing one portion of the instrument's register.

Often, bracketed sections will be extended across the time-axis using a thin, dark arrow—especially when only minimal information need be provided in the brackets themselves. This arrow indicates that play continues for the duration. No particular "development" of performed material need occur over the duration, though neither is it expressly forbidden.



[15] *open improvisation across different registers of the instrument, but all over an [imagined] E♭ diminished chord*
[16] *repeat something like this **pp** to **mp** gesture until double bar line*

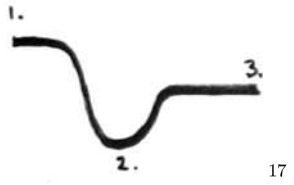
Dots, lines, and curves

THE FUNDAMENTAL QUANTA OF GESTURE

The most basic notational sub-units in this scheme are **dots, lines, and curves**. Dots (being in essence very short lines) indicate single short attacks at a particular time (or with a particular density...) Precise attack envelopes (staccato, staccatissimo, tenuto, etc.) are, unless otherwise specified, left to the player's discretion as best befits the performance.

Straight horizontal lines indicate longer attacks. In the case of percussive or non-sustaining instruments, these might be interpreted as a single attack which decays for the duration or as a stream of attacks in that given pitch-space.

I will take care to describe curves in more detail as I take it that despite the intuitiveness of a simple melodic contour, they are apt to be misunderstood. A curve across a given territory has a start, middle, and end point



17

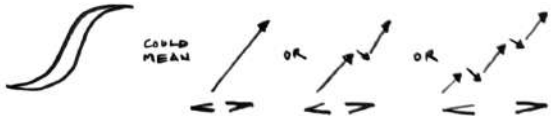
and might be simple or more complex.

18

19

[17] *begin high, descend rapidly, end in middle register*
[18] *begin quiet, ascend, then rapidly descend while getting louder*
[19] *follow this approximate contour*

A curve not otherwise marked could be performed either as a legato stream of notes **or** as a "true glissando" following *roughly* the contour indicated.



It is *not* my intention that the precise "topography" of the curve's contour distract the performer from making good music. In all likelihood, the needs of the musical situation might dictate a somewhat different contour than is indicated. The most salient parts of curve gestures are thus their **duration**, **start and end points**, and **relative complexity**.

Trills

Trills are considered a proper subset of curves—namely curves which demonstrate rapid regular or irregular oscillation with a comparatively short "wavelength." As such, there is no categorical distinction between a "trill" and a complex curve. Unless otherwise noted, "trill" figures are not limited to half- or whole-step oscillation. The figure below demonstrates *a rapid, louder trill, a crescendo on a single tone, then a slower, smoother trill.*

Alternately, more conventional trills may be notated using the standard ***tr*** figure, which may or may not be be accompanied by an interval/direction.

[20]

[20] *play something like these rhythms; trill over the longest tone*

Dynamic indications

stroke thickness

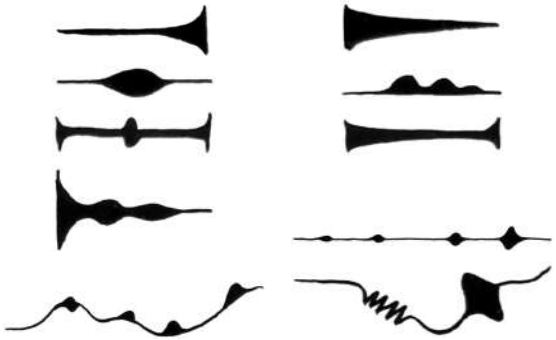
Dynamics are communicated in two ways. Traditional ***pp ff sffz***-style dynamics as well as ***cresc.*** and ***dim.*** hairpins should be observed as usual. Often, though, when gestural dynamics should vary on a "note-by-note" basis, the **stroke**, i.e., the thickness of the dot, line, or curve, will be used to denote dynamic changes.

During instances where little to no dynamic information is given (extended sections of uniformly thin lines, for example), the player is encouraged to tweak local dynamics themselves to suit the playing environment. For instance, the figure below need not be performed ***ppp*** unless directions make it clear.[21]

[21] This is primarily a caveat included to prevent the engraving of large scores from becoming excessively onerous. Uniformly thin lines are simply easier to render and therefore may stand in for a "choose-your-own-dynamic" indication in the absence of other instructions.

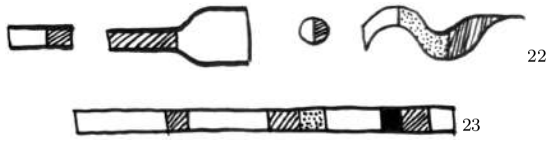
Attack envelopes

Variations in stroke width are often used to indicate specific **attack envelopes**. These can of course be combined with **curves**. Below, in no particular order, are a sampling of various possible attack envelopes. The first eight are seen on a single pitch; the final two combine changing attack envelopes with curves/trills.



Timbral flux

visual texture :: sonic texture



A change in the **"visual" texture** of a dot, line, or curve is used to indicate a change in **timbre** (the precise details of which are left up to the performer). This might mean over-pressure (for strings), muting (for brass) or any other means of modulating timbre the player deems fit.

Markings indicating a change in timbre need not be consistent across a performance—only, ideally, across a given gesture. For instance, in the diagram above, a player may begin the initial gesture with a clean, dark timbre where the glyph becomes hatched. At the onset of the subsequent gesture, however, the hatched texture of this new glyph could be interpreted as a new timbre entirely.

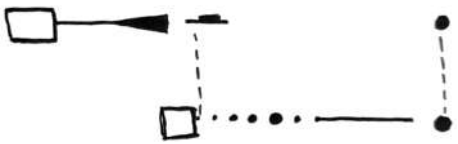
[22] *from left to right: change timbre on a single pitch at a fixed dynamic; change timbre on a single pitch while getting louder; change timbre in the middle of a short attack; change timbre twice over the course of this legato phrase*

[23] *change timbre multiple times throughout this long-tone*

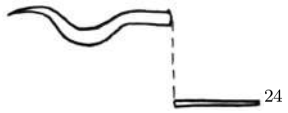
Simultaneity lines

tying events together

In scored music which is often unmetered, **gestural simultaneity** becomes an important notational concern. When two events are meant to coincide, a dashed vertical line connects those two events (be they the beginnings or endings or middles of gestures). These most often occur **between** two players, but will also occur in a single player's music to clarify an otherwise ambiguous passage.



In the figure above, simultaneity lines are shown between the two players. The first player begin with a crescendo on a single tone with an abrupt cutoff; the second player begins **as soon as** the first player rests. After a short passage, both play a staccato attack together.

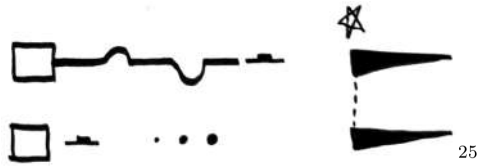


Without the dashed line in the figure above, it would be difficult to see at a glance if appreciable space exists between the low tone and the high one—thus a line is used to show that the high tone should follow immediately rather than after a short rest.

[24] *play this contour then (without a pause) jump down to a steady low pitch*

Cuing

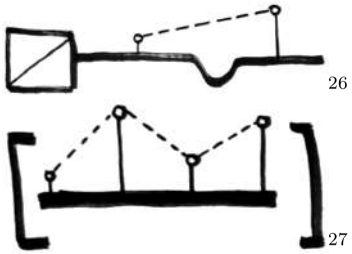
Occasionally, for ease of rehearsal and performance, **markers in the form of stars** will be placed above synchronous events to indicate potential **cue points**—for instance, simultaneous attacks following fermata'd rests.



[25] Here a star marks a potential cue point where precise simultaneous re-entry might be difficult otherwise.

Lollipops

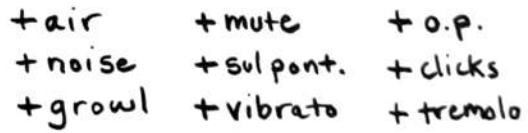
REPRESENTING CHANGING PARAMETERS



[26]

[27]

"**Lollipop**" glyphs are used to indicate some **modifier**, i.e. a parameter which varies over the course of a gesture. As mentioned in Section 2.3 (**The box**), this parameter will usually be indicated in the southeast corner of the "box" clef and may include things like bow position, airiness, noisiness, amount of mute, etc. Any parameter which could conceivably be represented with a single increasing and decreasing value could happily be encoded with lollipops:



The first lollipop will appear where the changing parameter should begin and a dotted line will indicate the **relative degree** of that technique. I typically use strictly linear progressions from one lollipop to the next rather than curved lines—although there is no hard-and-fast rule saying this must be the case. A dashed line without an accompanying terminator indicates that the parameter should remain at

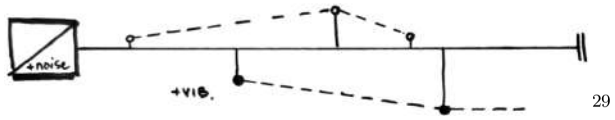
[26] *an undefined parameter increases while this simple pitch contour is performed*

[27] *an undefined parameter oscillates on a single pitch in an in-this-manner bracket*

its last value until "reset" at the next gesture. In the absence of any further information in subsequent gestures, one should assume that the lollipop no longer holds.

[28]

As shown in the graphic below, two simultaneous changing parameters are relatively easy to deploy as long as both are clearly labelled. I suspect that attempting to represent more than two parameters would render a passage unwieldy and would perhaps best be saved for a different sort of compositional practice.



[29]

[28] *a parameter decreases over the course of a legato phrase; the same parameter begins again in the middle of a staccato passage and remains constant*

[29] *a single pitch is altered by two parameters: noisiness is represented by the top lollipop since it's given in the box; vibrato is represented by the bottom lollypop and is defined by the tag to the left*

Relational signs

situationally dynamic improvisation

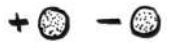
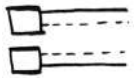
A specific class of glyphs, **relational signs** indicate some relationship between the currently active material and some other material—either another player's or one's own. In the following list, I have attempted to encompass quite a wide range of relational possibilities without developing so many new symbols that they begin to tax the performer's recall abilities. For ease of execution, I recommend re-articulating the meanings of these glyphs in individual scores.

some common examples

 *match x*	match target's playing (in terms of pitch, rhythm, timbre, etc.)
 *ignore x*	perform as though target is not present
 *support x*	perform in such a way that target serves as the "foreground" to your "background"
 *dominate x*	perform in such a way that target becomes "background" to your "foreground"
 *build upon x*	develop an idea presented by target (either another player or a previous gesture)
 *echo x*	serve as an "echo" to target player or gesture
 *memorize x*	commit (some aspect(s) of) target to memory for later use
 *recall x*	recall that which was committed to memory in the "memorize" gesture

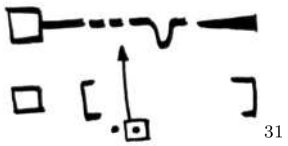
...and here are some potentially powerful but as-yet-unused examples:

unused (but interesting) examples

 *louder/softer*	
 *denser/rarer*	
 *higher/lower*	
 *purer/noisier*	
 *faster/slower*	
 *decompose x*	perform x but with "pieces missing" or in some way incomplete or broken-down
 *exaggerate x*	perform x but in some way exaggerated (wider contours, louder, etc.)
 *rhythmicize x*	perform x but now conforming to some sort of rhythmic grid
 *rubato x*	perform x but now without regard to a rhythmic grid
 *multiply x*	take a fragmentary gesture x and multiply it indefinitely
 *counterpoint x*	provide counterpoint (rhythmically, pitch-wise, timbrally) to x

In context, the relational sign will be placed at the bottom-left of an accompanying gesture and will use an arrow to indicate its point of reference, be it another player's gesture or one's own.


30


31


32

[30] *build upon previous gesture*
[31] *ignore other player's gesture*
[32] *echo other player's gesture*

Other global signs

Incorporating pitched material
notational hybridity


33

A central goal of this system is a more-or-less seamless integration of traditionally notated materials with new open glyphs.

Pitched material may be incorporated in several ways. Rarely, notation may be included which is fully rendered with meter, tempo, dynamics, etc. However, more commonly, several of these factors are omitted in favor of fixed pitches to be played in a given order but with no rhythmic/durational information. Other times, no order is specified.


34

In instances where rhythms are given, these rhythms are to be performed proportionally unless otherwise noted.


35

[33] *over a D major chord play a falling gesture followed by three staccato attacks, then play something like the given chords, then play this accelerando gesture on A3*
[34] *play something using these pitches with no particular rhythm*
[35] *play something like these pitches/rhythms proportionally—i.e. not necessarily in sync with anyone else*

"Relative" rests

36

Often, players will see eighth-, quarter-, half-, and whole-rests "floating" amidst other open glyphs. Unless otherwise marked, these **floating rests** are to be understood as "psychological" proportional indicators rather than as concrete durational values—i.e. eighth = quite short rest, quarter = longer rest, whole = quite long rest, etc.

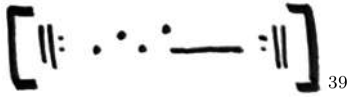
37

[36] *one interrupted pitch followed by a long rest*
[37] *play this gesture with rests of various proportional lengths*

Repeats

When a repeat is used to enclose a gesture, the player ought to loop that gesture (to the best of their ability) rather than extend and develop it. The duration of the repeated gesture will be (as usual) denoted by the amount of territory enclosed by the repeats, while the duration of the overall repetition will be indicated with a simple arrow or a strict **number of repeats (2x, 3x, etc.)**.

38



39

[38] *repeat this long-short-long figure*
[39] *"in the manner of" a repetition of this staccato-then-single-tone phrase*

Transition arrow
gradual becoming

This thick, more elaborate arrow is used to indicate that a player should **transition gradually** (rather than jump-cut) from one "sound world" into another using whatever means they deem appropriate. The length of the arrow indicates the proportional duration of the transition period.

 [40]

[40] *transition rather quickly from a mix of longer and shorter attacks to consistent short attacks in a narrow pitch band.*

"Grid" indications
rhythmic/arrhythmic

These symbols are used to indicate that improvisation should occur either **metronomically** ("on a grid"—i.e. using an imagined isochronous pulse governing performed rhythms),

semi-metronomically (semi-pulsed),

or **unmetered**.

As a general rule, gestures are to be understood as unmetered unless otherwise noted. Furthermore, two players simultaneously playing **metronomic** gestures *need not* match tempos unless the "match "x"" glyph is also present. Rather, they should each strive to maintain a consistent, independent tempo until unmetered play resumes.

 [41]

[41] *as usual, an arrow will be used to indicate the point of reference for the* ***match x*** *relational sign.*

"Interruptions"

Two symbols are used to indicate **interruptions** of the ongoing flow of a gesture.

indicates an interruption "**in time**" which interjects sound of the player's choosing in such a way that the proportionality of the gesture group is unaltered—often a sudden burst unrelated to the rest of the music in question.

On the other hand,

indicates an interruption "**out of time**"—i.e. of open duration, breaking not only the sonic flow, but also the *temporal* flow of the gesture.

Chapter 3

Family-specific glyphs

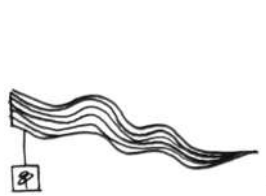
Polyphonic Instruments

Chords and chord-density

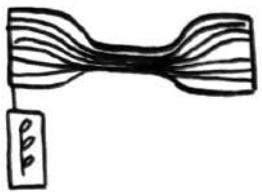
Homophonic gestures (that is, gestures which are primarily composed of vertically-stacked harmonies rather than monophonic single-note lines) present a unique challenge to notation in this scheme, given the scheme's reliance on essentially one-dimensional simple linear figures. As such, generically homophonic material is shown using **striated dots and contours** which are textured with **parallel, left-to-right oriented bands**.

1

As usual, the approximate range of the gesture is given by its position on the y-axis. Note that the striations themselves do not give any particular information as to the intervallic content or chord voicing—these properties, if constrained at all, will be given elsewhere; usually in the accompanying box or attached to the gesture with a flag. To this end, a widely-spaced staffless half-note chord indicates that the player should favor more open voicings. Converseley, a clustered half-note chord points to tighter, closed voicings.



2

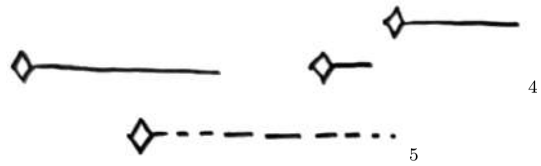


3

[1] *from left to right: long, chordal attack, quite loud; legato figure composed of chords; three short chordal attacks; wider-range chordal legato figure*
[2] *descending chordal legato passage primarily using "closed" or "cluster" voicings*
[3] *loud-soft-loud gesture using "open" (widely spaced) voicings*

Strings

Harmonics



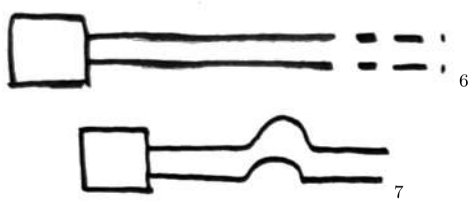
4

5

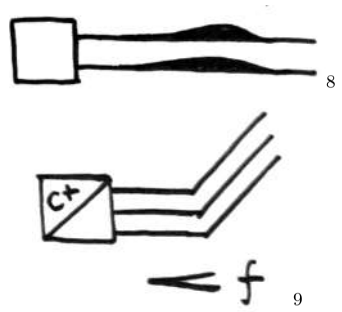
Harmonics are indicated by a **diamond** glyph preceding a duration line. As harmonics tend to be considerably higher than stopped pitches, the harmonic figure in essence temporarily overrides the prescribed range and should be understood to be high- or low-pitch in relation to other harmonics present.

[4] *plain, unbroken harmonics*
[5] *a "morse-code" —i.e. mixed long and short attacks—harmonic*

Double-stops et al.



Double/triple/etc. stops are, predictably, indicated by **multiple concurrent duration lines**. They may move in parallel or in contrary motion and may feature distinct attack envelopes, etc.



[6] *a double stop on a single pitch which is interrupted toward the end of the gesture*
[7] *a double stop which begins and returns to a single pitch*
[8] *a double stop which peaks in intensity toward the middle of the gesture*
[9] *a triple stop using a C-augmented pitch set which rapidly ascends and gets louder*

Winds

Multiphonics

Multiphonics are indicated by a unique glyph (borrowed from Braxton's "Language Music" scheme) preceding the duration line. In the absence of other direction, multiphonics should be chosen based on the figure's position on the y-axis.

In some instances, unspecified but **discrete** multiphonics are desired. In this case, the initial glyph will be textured using "timbral change" glyph textures. These distinctions are local to the gesture, similar to changes in **timbre (section 2.7)**—i.e. the multiphonic signified by the hatched symbol need not be consistent across the entire piece; only until the **box** clef indicates the start of a new gesture.

[10] *two discrete multiphonics in approximately the same register and with the same dynamic*
[11] *three discrete multiphonics at different dynamics*

Brass

Mutes

[12]

The use of mutes is certainly permitted/encouraged in the absence of other instructions. Sometimes, though, the use of a plunger-style (**dynamic**) mute is called for expressly in the score in the **southeast** corner of **the box** ("+mute"), in which case a **lollipop** will indicate the extent/velocity of mute movement.

Other (**static**) mutes will be indicated using text as usual.

[12] *interrupted attack(s) on a single pitch while opening/closing the mute*

Percussion

Special considerations for percussion

There are special challenges inherent in notating improvised percussion music. The percussionist has myriad instruments at their disposal with a concomitant wide array of techniques which often necessitate case-by-case notation schemes (see research by Lindsay Vickery et al.[13]) As such, I take a generalist, instrument-agnostic approach by mapping percussion instruments to the y-axis according to their average spectral content. If a particular instrument is desired for a given gesture, then an arrow should be used to connect that gesture to the appropriate name or pictogram of the instrument.

Drum kit

In the case of the drum kit, for instance, one might include a small diagram as part of the "clef" figure which includes explicit mapping-regions illustrated by **pictographic instruments**.

In the figure below: typical trap kit components loosely arranged according to spectral content. Top to bottom: crash/splash; ride; snare; tom; bass. These may be changed to suit intended trap kit setup.

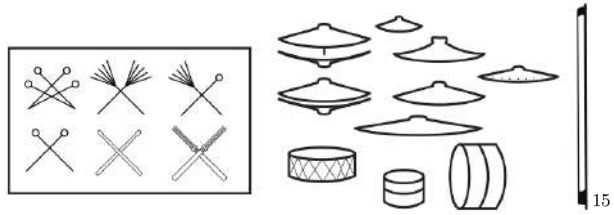
Here shown in context:

[13] Vickery, Lindsay et al., "Expanded Percussion Notation in Recent Works by Cat Hope, Stuart James and Lindsay Vickery," 2017.

14

Other percussion

"Custom" pictograms may serve a valuable role in efficiently communicating a desired technique. Shown below are just a few that have been deployed in past pieces.



15

[14]The "clef" illustrates approximate regions of play corresponding to height of the line. In this case, the gesture may be interpreted as *ascending in spectral space while playing low attacks (probably on the kick drum); then, open improvisation in the upper register*

[15]Left in box: various sticks/mallets; center: various cymbals/drums; right: bow.

Chapter 4

Room for development

The voice

Though there is nothing stopping an intrepid vocalist from performing open-instrumentation pieces featuring this style of notation, the scheme has yet to expand into vocal music proper. Of particular interest might be glyphs which pictographically represent common "vowel shapes" or vocal formants, as well as some elegant means of providing pools of available syllables/words/phrases which might be attached to particular gestures.

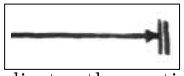
Electronic instruments

Given their unmatched potential for sonic diversity, electronic instruments pose the thorniest problem for efficient, broadly-applicable notation. Again, there is very little that would prevent an electronics-specialist from performing instrument-agnostic scores. However, to fully take advantage of the vast timbral range encompassed by analog synthesizers, samplers, software instruments, etc., the composer must often develop bespoke solutions to fit individual instruments/instrumentalists.

One solution might be to more concretely map graphic textures to sonic ones. E.g., one might depict the process

of increasing grain size (for a granular synthesis patch) with a less-and-less-dense field of dots filling in a pitch curve. Perhaps the presence or absence of white noise in a signal could be signified by shades of gray. These are, of course, kindergarten-level analogies which do not even approach the level of sophistication possible with modern electronic instruments. Nevertheless, work will continue in this arena as opportunities to compose for electronicists present themselves.

Glossary

arrow 

indicates the continuation of a gesture as laid out in the previously enclosed territory.

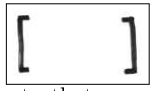
Large, elaborate arrows 

on the other hand, indicate transition between one "sound world" and another. 20, 33, 36, 37, 46

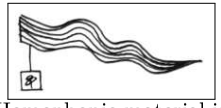
axis Time is represented on x-axis; pitch on y-axis. 13

box 

serves as a combined "clef" and "key signature," containing information about the following gesture. 18, 29, 41, 45

brackets 

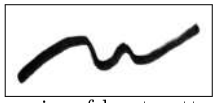
indicate that a gesture is to be played "in this manner" rather than note-for-note. 19

chord 

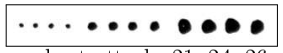
Homophonic material is represented by dots, lines, or curves striated with horizontal bands. Closed/open voicings indicated by flags attached to gesture. 41

cue 

Suggested cues are indicated by stars above events or parts of events which are to occur simultaneously. 28

curve 

a series of legato attacks which rises and falls according to the given contour. 21, 23, 24, 26

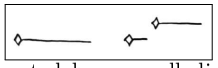
dot 

a short attack. 21, 24, 26

dynamics 

indicated using traditional figures (***pp***, ***mf***, etc.) or by varying the thickness of the "stroke" of the dot, line, or curve. Attack envelopes are demonstrable using changing stroke thickness. 24

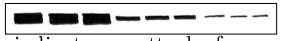
glyphs fundamental units of notation; everything besides text is considered a glyph. 13

harmonic 

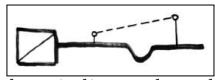
represented by a small diamond glyph attached to a line indicating duration/dynamic—understood to be higher than would be indicated by location on y-axis. 42

interruption 

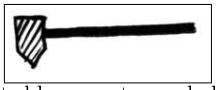
represented by a center-less asterisk; may be "in time" or "out of time" (if bracketed). 39

line 

indicates an attack of proportional duration. **Dashed vertical lines**, on the other hand, indicate points of simultaneity between two events, two players, etc. 21, 24, 26, 27

lollipop 

used to indicate the relative presence or absence of some parameter specified in the box or elsewhere. Lollipops may be connected by a dashed line indicating a general rate of change. 29, 45

multiphonic 

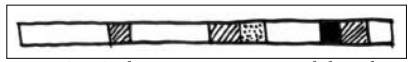
represented by a pentagonal glyph with or without texture—usually attached to a line indicating duration/dynamic. 44

pitched material may be incorporated in a number of ways, ranging from "fully-notated" to "pitches and rhythms" to "proportional notation" to "pitch classes only". 34

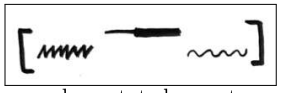
relational signs come in a wide variety; indicate specified relationship between two players, two gestures, etc. Referent will be indicated with an arrow. 31

stroke thickness of stroke indicates relative dynamic. 24, 25

texture the (visual) texture of a dot, line, curve, or other symbol indicates some form of timbral variation, either specified or unspecified. 26, 41, 44, 48

timbre 

changes in timbre are represented by changes in the visual texture of a dot, line, or curve. 26

trill 

may be notated as a type of curve which oscillates rapidly or using traditional ***tr*** figure. 23

APPENDIX B

I DIE EACH TIME I HEAR THE SOUND: PROGRAM AND PERFORMERS' NOTES

I DIE EACH TIME I HEAR THE SOUND

WITH PERFORMANCES BY:

ISAAC OTTO — WINDS

JOÃO MARTINS — PIANO

STEVEN LEWIS — DRUMS

MATTHEW NELSON — SAXOPHONE

BELLA PEPKE — VIOLONCELLO

NILOUFAR SHIRI — KAMANCHEH

COLLIN FELTER — TROMBONE

JAMES ILGENFRITZ — BASS

ATTICUS REYNOLDS — DRUMS

AN ICIT "CAPSTONE" CONCERT

SUNDAY THE FOURTH OF JUNE '23

CLAYTOSMUNDA CLAYTONIANA

"INTERRUPTED" FERN — A VERY OLD SPECIES. ALL OTHERS IN ITS GENUS ARE NOW EXTINCT, AS FAR AS WE KNOW.

JM

MODULAR NO. XV

THE FIFTEENTH IN A SERIES OF SHORT PIECES MEANT TO BE SMASHED UP, BROKEN APART, AND PUT BACK TOGETHER

10/CF/AR

W/M

A LARGE, GRIMY WAREHOUSE HOLDING DETRITUS TO BE SORTED FOR RECYCLING

10/BP/GL/JI

SOSTANZA COME IL SANGUE

"A SUBSTANCE LIKE BLOOD"... BUT PROBABLY NOT BLOOD?

10/MN/CF/JM/BP

Q?-TET

A "HYBRID" PIECE FOR FOUR OR FIVE MUSICIANS

10/MN/JI/JM/AR

NEMAT-SPACE

A "VERMICULAR" SPACE — DENSE WITH THE TWISTING HOLES LEFT BY BURROWING WORMS

10/NS

HIGH STRUCTURE CARBON BLACK

"DISCLOSED HEREIN ARE METHODS OF SYNTHESIS AND TREATMENT, AND DISPERSIONS AND INKJET INK FORMULATIONS PREPARED THEREFROM. THE CARBON BLACK CAN HAVE THE FOLLOWING PROPERTIES: OAN ≥ 170 mL/100g AND STSA RANGING FROM 160 TO 220 m^2/g."

10

ILLUMINATION METHOD AND LIGHT-EMITTING DEVICE

"...CAPABLE OF ACHIEVING... AN OBJECT APPEARANCE... AS NATURAL, VIVID, ... AND COMFORTABLE AS THOUGH PERCEIVED OUTDOORS IN A HIGH-ILLUMINANCE ENVIRONMENT."

10/MN/CF/BP/JI

ISAAC'S CAPSTONE CONCERT: PERFORMANCE NOTES

1. CLAYTOSMUNDA CLAYTONIANA

a. FOR **JOAO (p)**
b. Performer plays as written, inserting cells as desired into the texture. Cells should sound/function as forceful interruptions of the texture — in stark contrast with the original material. Think "jump-cuts" or sudden changes of camera angle.
c. At some point PRIOR TO the natural end of the piece, ISAAC and COLLIN will enter, at which point JOAO should TRANSITION from written material to open improvisation.
d. Open play will continue for TWO to THREE minutes. JOAO will then TACET.
e. I + C will continue playing until ISAAC's signal, where PIECE 2 will begin.

2. MODULAR XV

a. FOR **ISAAC (b. cl)** + **COLLIN (tbn)** + **ATTICUS (d)**
b. PRIOR TO piece, ISAAC and COLLIN play OPEN — approximately ONE MINUTE
c. ISAAC will give a signal (after dropping out?) and PIECE 2 will begin (bringing COLLIN and ATTICUS in)
d. Piece continues as written.
e. Exit: COLLIN, Enter: BELLA, STEVEN, JAMES

3. W/M

a. FOR **ISAAC (winds)** + **BELLA (vcl)** + **STEVEN (d)** + **JAMES (cbs)**
b. Rules-as-written apply
c. This is a TIMED PIECE. For each MINUTE that elapses, players should navigate two cells. This is not to say that each cell need take 30s precisely — just that each minute-long window of time should see the completion of two cells.
d. Despite appearances, cells need not directly flow into one another — generous SILENCES may well be beneficial to the emergent sound-world.
e. There are no brackets in this piece — this means that cells ought to be interpreted more-or-less "literally" — i.e. one attack per stroke (not including interruptions). No one need go crazy calculating precise proportional durations, pitch heights, etc. (unless they're so inclined) but the GENERAL pitch durations/contours ought to be respected.
f. There's a little more liberty in the dynamics than is represented in the score. More dynamic range is hardly ever a bad thing. Stroke thickness can guide you but don't worry about it too much.
g. Despite its considerable strictures, I still think of this as an open, improvisatory piece. Try to lean into those factors over which you have agency: simultaneity, density, blend, dynamics, silence, etc.
h. EXIT: STEVEN, Enter: JOAO + MATTHEW + COLLIN

4. SOSTANZA COME IL SANGUE

a. FOR **ISAAC (cl)** + **MATTHEW (ts)** + **COLLIN (tbn)** + **JOAO (p)** + **BELLA (vcl)** + **CONDUCTOR** (ideally JAMES)
b. The CONTENTS of cells need not conform to the metric grid, but the BOUNDARIES of the cells do.

c. There are only a few TYPES of cells in the piece: pulsed/"morse" figures, continuous unpitched material (air, OP, etc.), harmonics, wavering pitch lines, and pitch class set improv.
d. Cells should ALWAYS SUPPORT and NEVER DOMINATE the texture — improvised sounds should murmur and ripple under the prevailing harmony — consider them all one dynamic level UNDER the current texture.
e. Silence during cells is A-OK if you need a pause to reorient yourself — as long as you re-enter at the right time.
f. There are a bunch of quite long long-tones here. Re-articulation during long tones (for winds especially) is just fine as long as it occurs on beats ONE or THREE (like everything else).
g. EXIT: COLLIN + BELLA, ENTER: JAMES (as player), ATTICUS

5. Q - T E T

a. FOR **ISAAC (winds)** + **MATTHEW (ts)** + **JAMES (cbs)** + **JOAO (p)** + **ATTICUS (d)**
b. PLAY IS OPEN. The cells on the page represent individual "sound-worlds" I'd like the players to visit at some point over the course of play.
c. Play does NOT need to BEGIN with the first, nor END with the LAST cell — they should, however, be respectively the first and last cells with which players engage.
d. The central cell is more fixed than the others. Once you begin this cell, do not move on to other material until it has been "completed" to your satisfaction.
e. Repeats here ||: :|| should be taken at LEAST twice.
f. It is not necessary that all players "meet" in the middle cell — though neither is it forbidden.
g. DURATION of each cell is up to the performer — proportionality does not necessarily hold. There could be an imagined [ ]→ after each cell to indicate a continuation of that "sound-world".
h. EXIT: ALL BUT ISAAC, ENTER: NILOUFAR

6. NEMAT-SPACE

a. FOR **ISAAC (winds)** + **NILOUFAR (kam)**
b. Play begins in the semi-shaded box in the UPPER-LEFT and terminates in the cell in the BOTTOM-RIGHT.
c. [play] [stop] [ff] [rw] correspond to tape-related actions. Most of the requested gestures appear in [ ] brackets — denoting that gestures are to be performed "in this manner" rather than stroke-for-stroke. The demands of the moment can/should override reproductive precision.
d. As there are no time tamps present, durations of cells are contingent on your partner's actions and your own good taste.
e. NEMAT-SPACE is written for two players, each with (a) a small tape deck featuring MECHANICAL controls and some means of manipulating pitch (b) their preferred instrument(s) and (c) auxiliary (small) instruments.
    i. PRIMARY sounds → generated by TAPE
    ii. SECONDARY sounds → generated by PRIMARY INSTRUMENT
    iii. TERTIARY sounds → generated by "little instruments" or unconventional materials.

f. While CONTINUALLY ENGAGING with your partner's actions, trace a path through the cells from start to finish.
   i. ————————> indicates a path during which tape should be PLAYING.
   ii. - - - - > indicates a path during which tape is AT REST.
g. Only cells marked "INST" explicitly feature SECONDARY materials.
h. EXIT NILOUFAR

7. HIGH STRUCTURE CARBON BLACK

a. FOR **ISAAC (winds)** alone
b. ENTER: MATTHEW + COLLIN + BELLA + JAMES

8. ILLUMINATION METHOD AND LIGHT-EMITTING DEVICE

a. FOR **ISAAC (cl)** + **MATTHEW (ts)** + **COLLIN (tbn)** + **BELLA (vcl)** + **JAMES (cbs)**
b. ★ marks indicate player-specific cues. Other players should all regard the specified player for rest or re-entry at that point.

APPENDIX C

W/M (2022)

GUIDELINES

Each player begins at A1 and navigates to H6, moving orthogonally right or down along a path of their choosing.

Then, each player similarly navigates back to A1 moving only orthogonally left or up.

Play ends once all players have finished their reprise of A1.

Boxes have no fixed duration and may "flex" to suit the given situation. Some attempt should be made, however, to keep the relative durations of segments inside a given box proportional.

Players may play boxes "attacca" or rest for a tasteful length of time between boxed modules; say, from one second to eight seconds.

The thickness of the line segment indicates a group-relative dynamic.

Ultimately this is a piece about *creative constraint*. That is to say: players should strive to balance more-or-less faithful reproduction of the boxed gestures with a cohesive and interesting group sound. This implies, for instance, that if on occasion a gesture must be "tweaked" in terms of proportional duration, dynamic, or tessitura to best fit the "live" situation, a player should embrace this opportunity. Musicality should not be sacrificed for exactitude.

LEGEND

= single pitch

= arcing gesture*

= leap directly to next pitch

= rest between pitches

* = interruption "in time," i.e. with respect to proportionality of module

[*] = `` "out of time," i.e. irrespective of proportionality of module

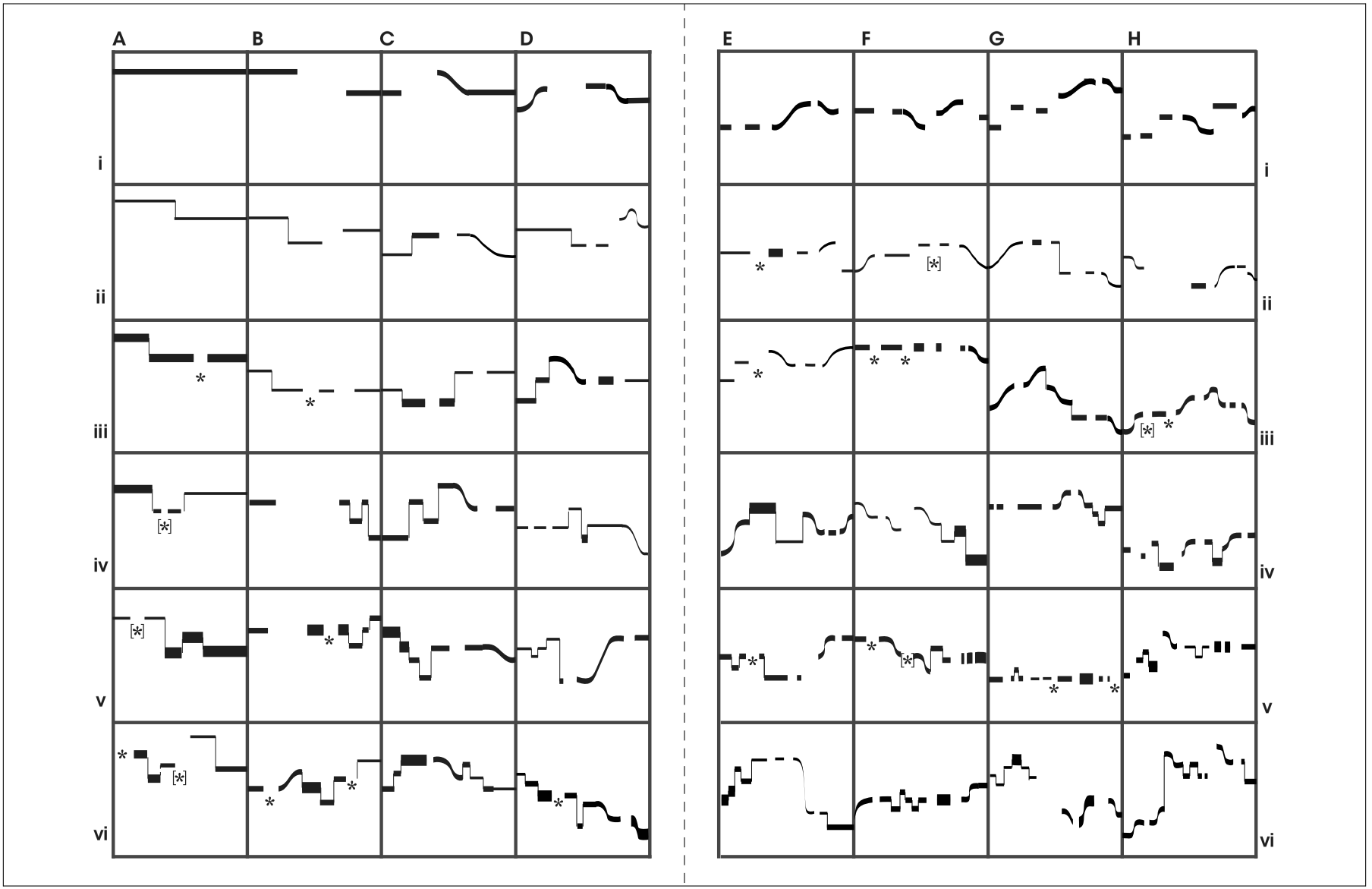
*player need not precisely follow arc contour - only start and end at the points indicated in pitch space and time

W / M

THEME FOR OBJECT-ORIENTED CARNAGE

ISAAC OTTO

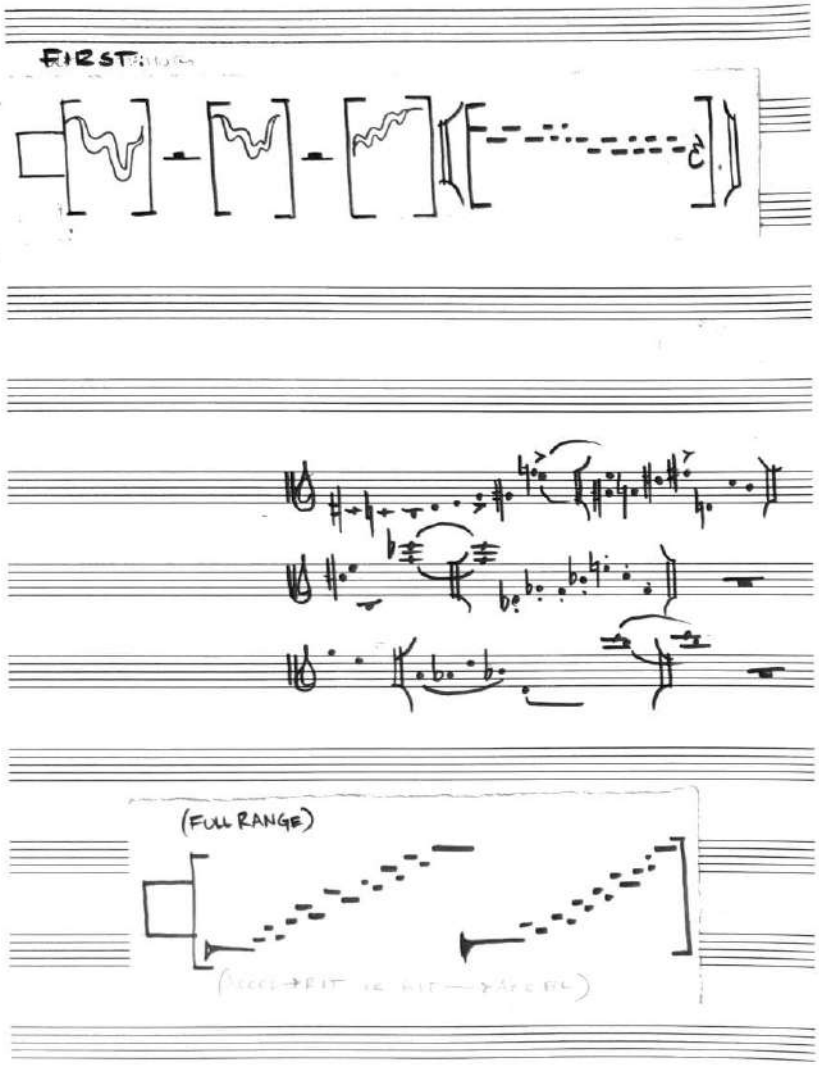
8 SEPTEMBER 2022

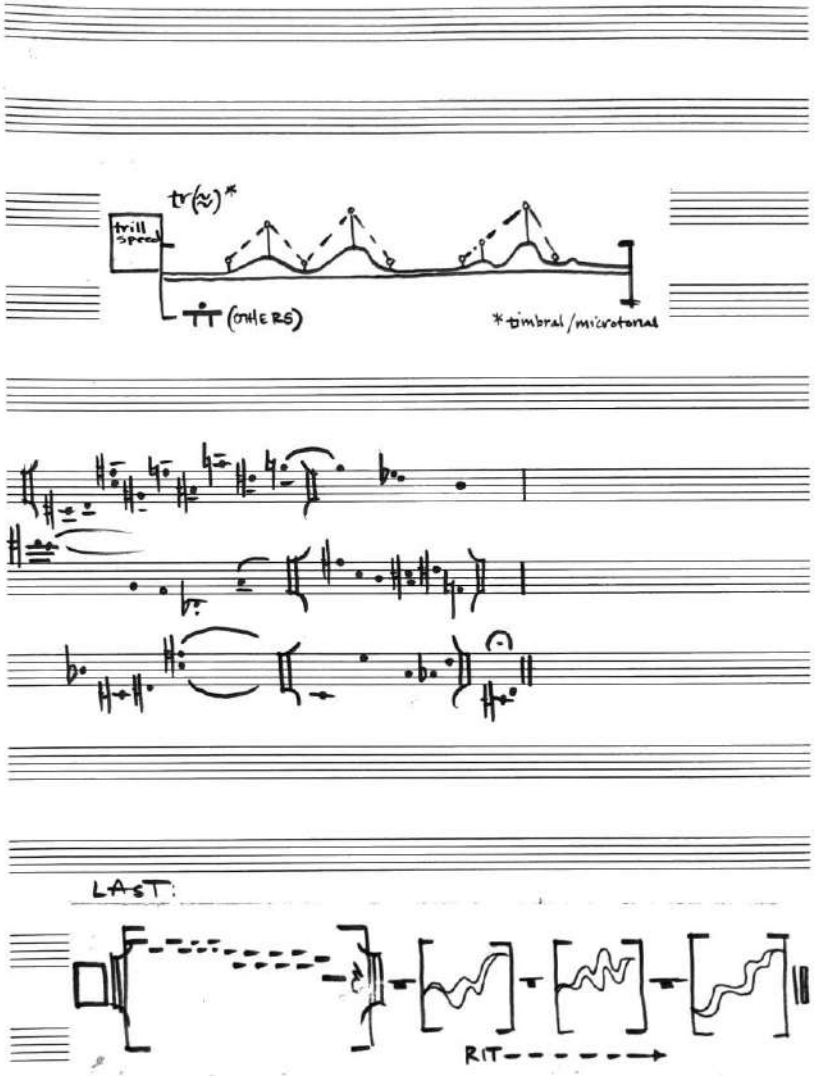

A
B
C
D
E
F
G
H
i
ii
iii
iv
v
vi

APPENDIX D

Q-TET (2023)

HORNS (Bb)





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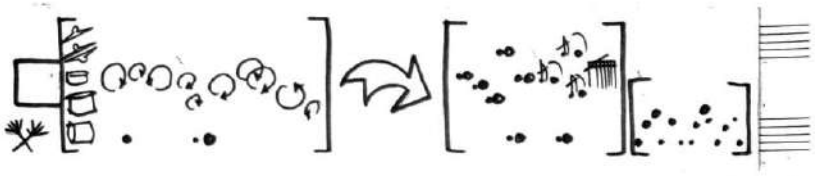
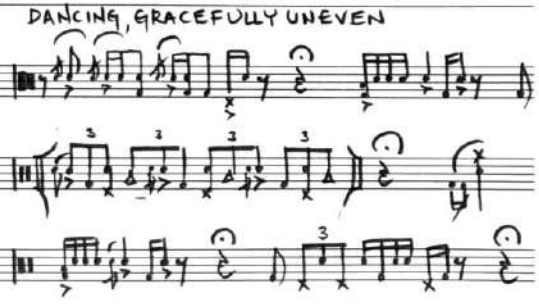
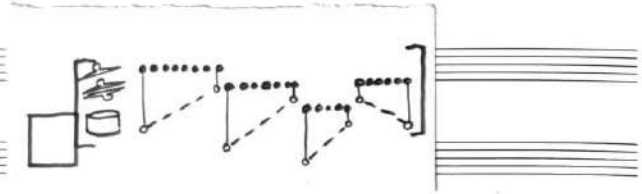
PERC.

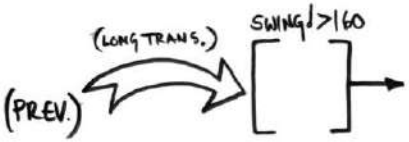
FIRST:

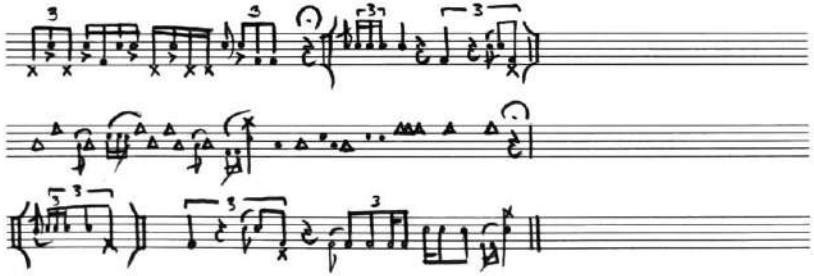


DANCING, GRACEFULLY UNEVEN









LAST:

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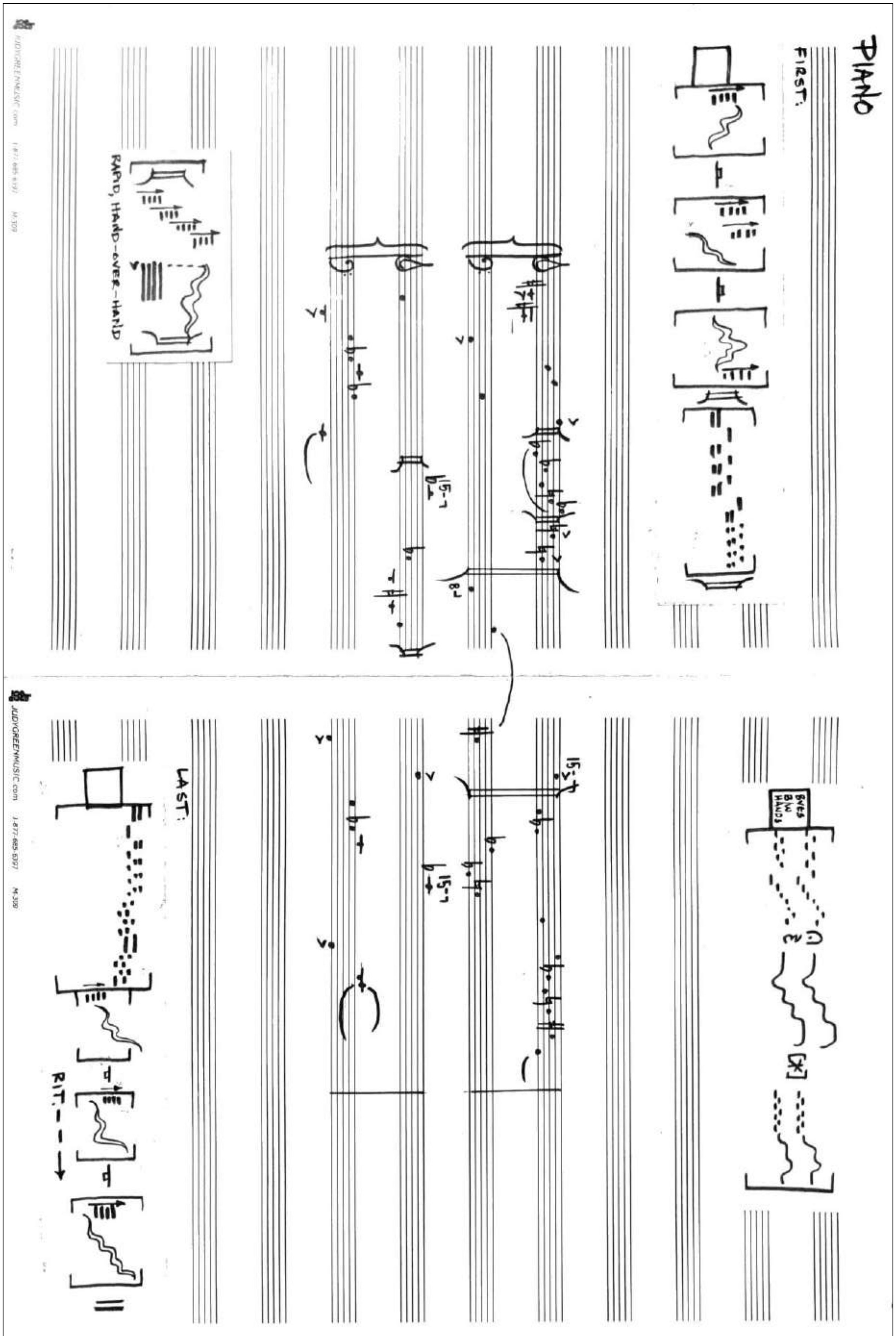
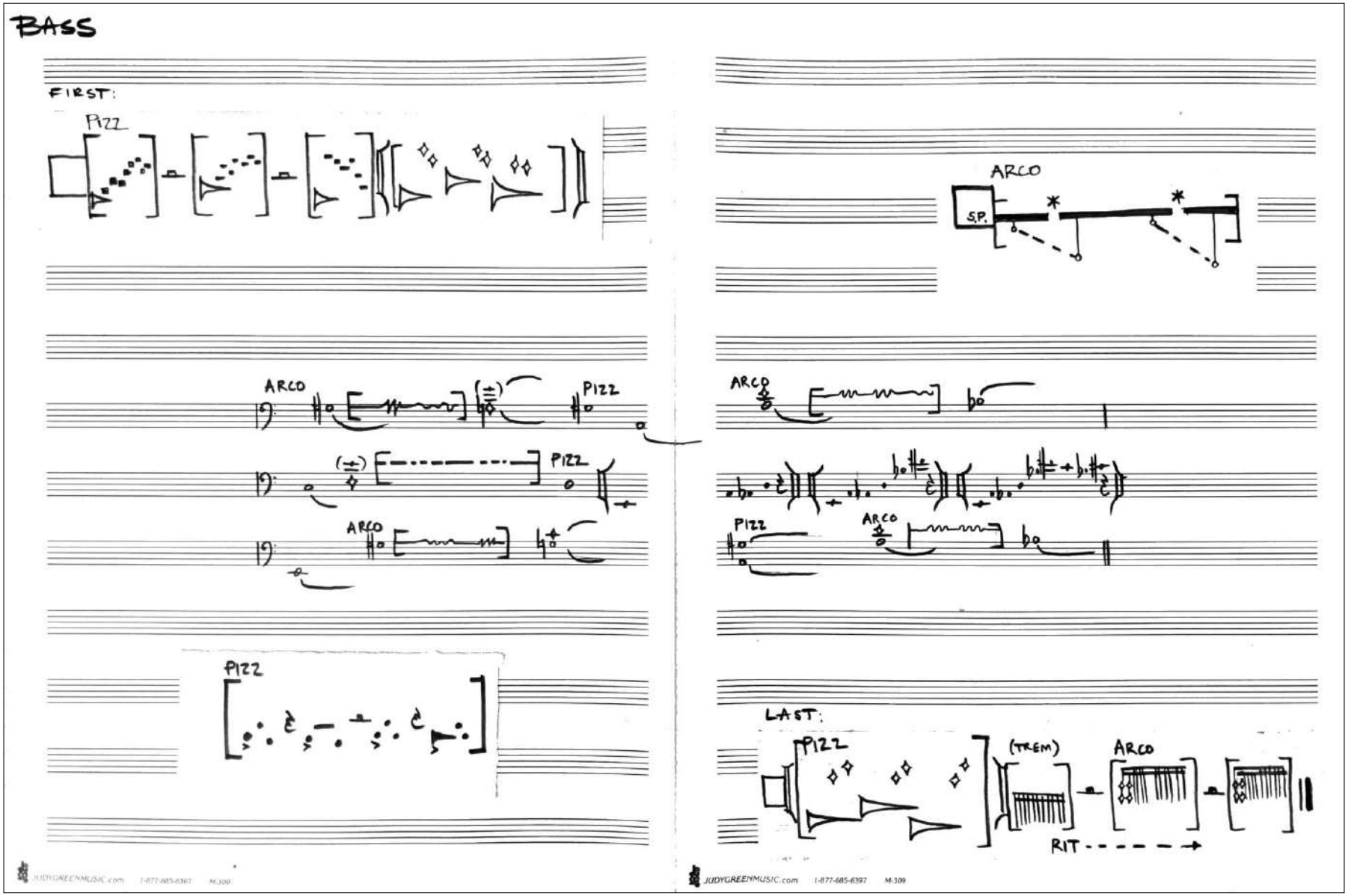

PIANO
FIRST:
RAPID, HAND-OVER-HAND
8VES B/W HANDS
LAST:
RIT.
JUDYGREENMUSIC.com
1-877-685-6397
M-309


BASS
FIRST:
Pizz
ARCO
S.P.
ARCO
Pizz
Pizz
ARCO
ARCO
Pizz
Pizz
ARCO
LAST:
Pizz
(TREM)
ARCO
RIT
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JUDYGREENMUSIC.com 1-877-685-6397 M-309

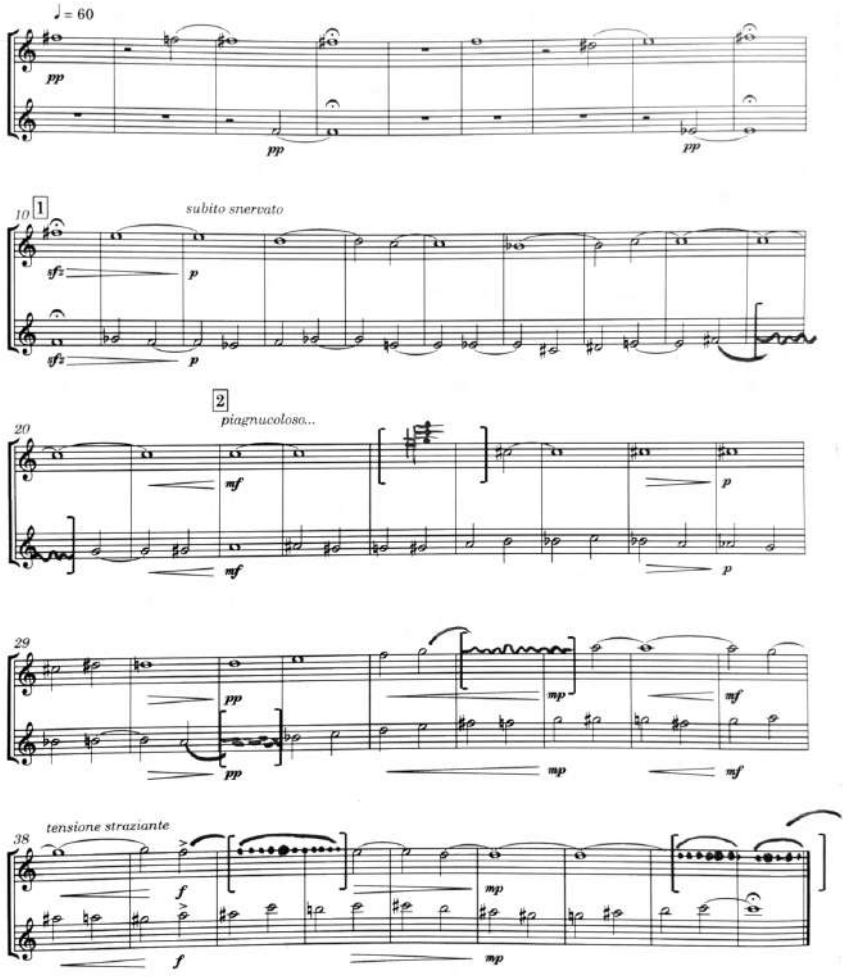
APPENDIX E

SOSTANZA COME IL SANGUE (2023)

TS
B♭CL

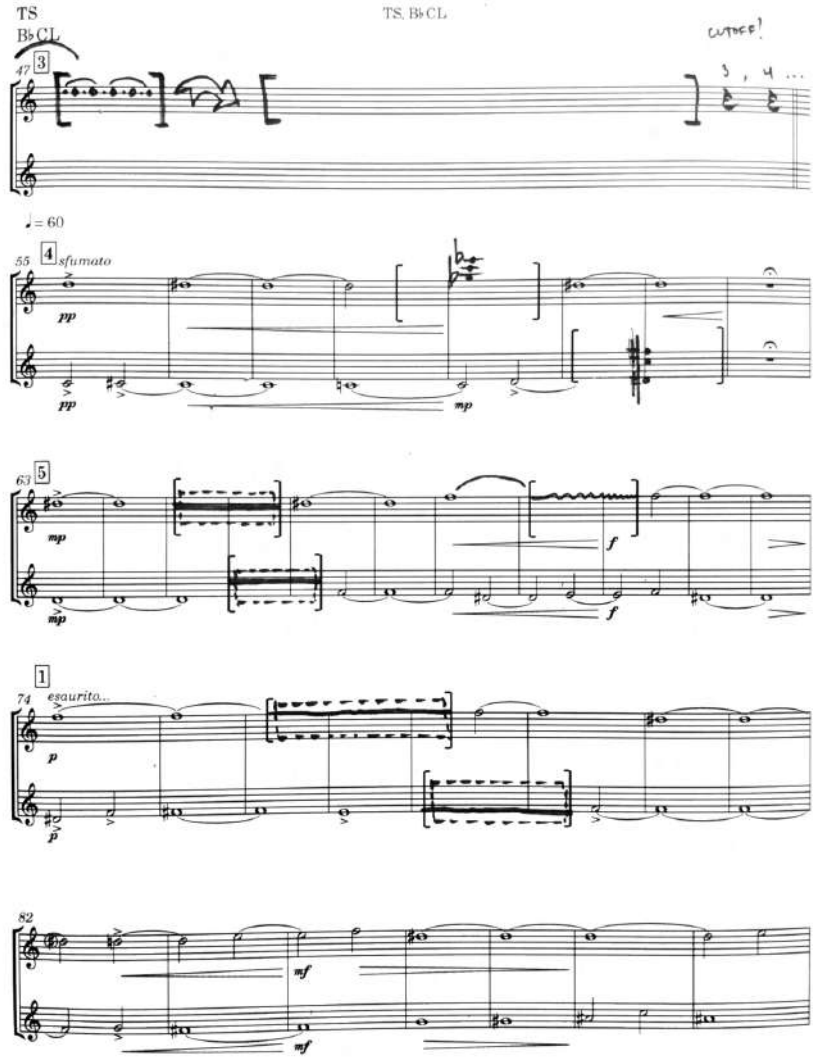
sostanza come il sangue

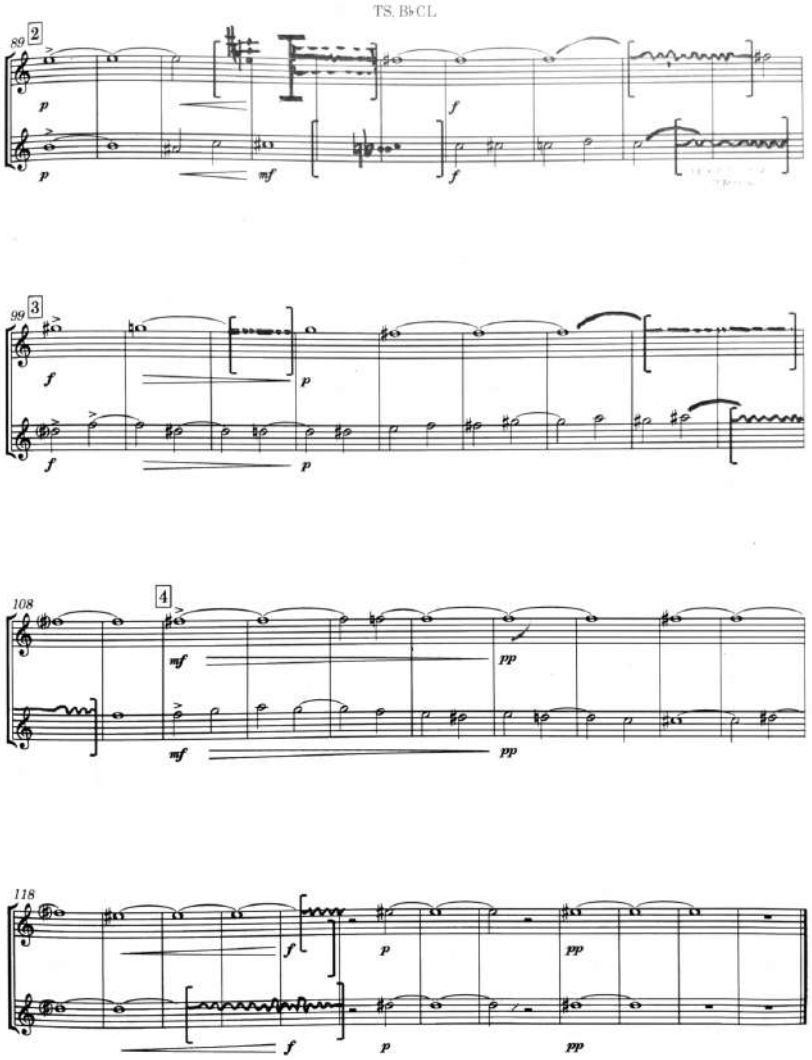
isaac otto



TS
B♭CL

TS, B♭CL

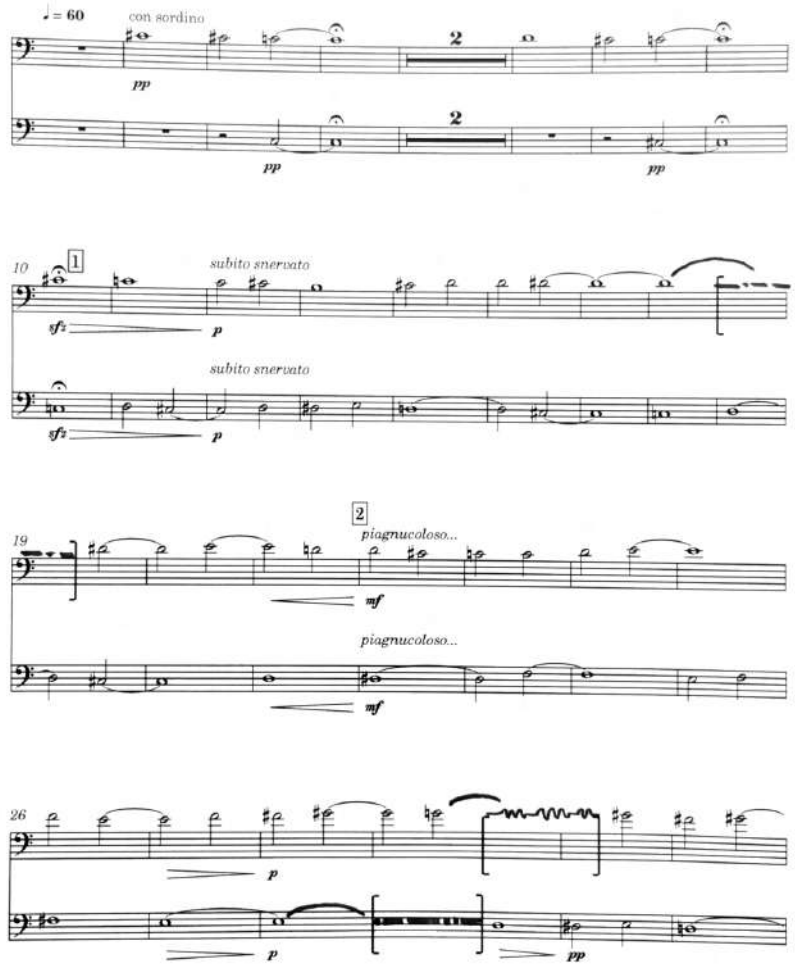




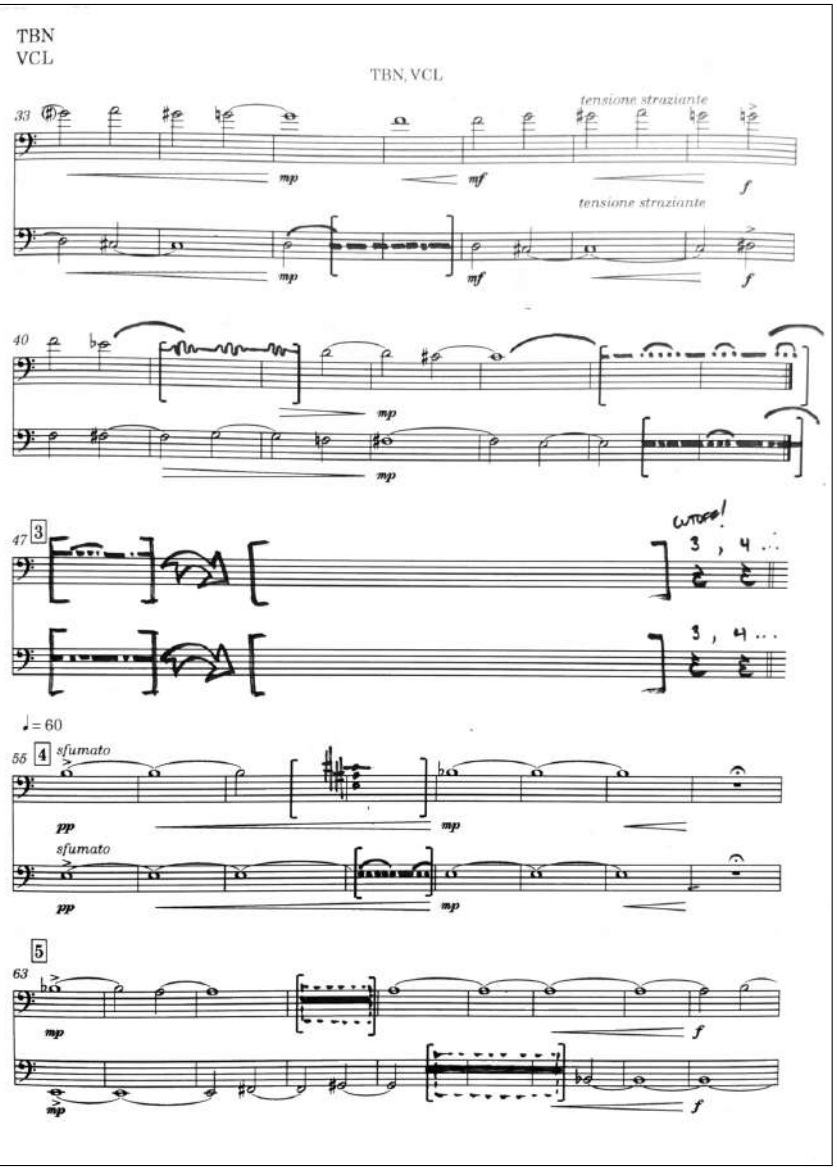
TBN
VCL

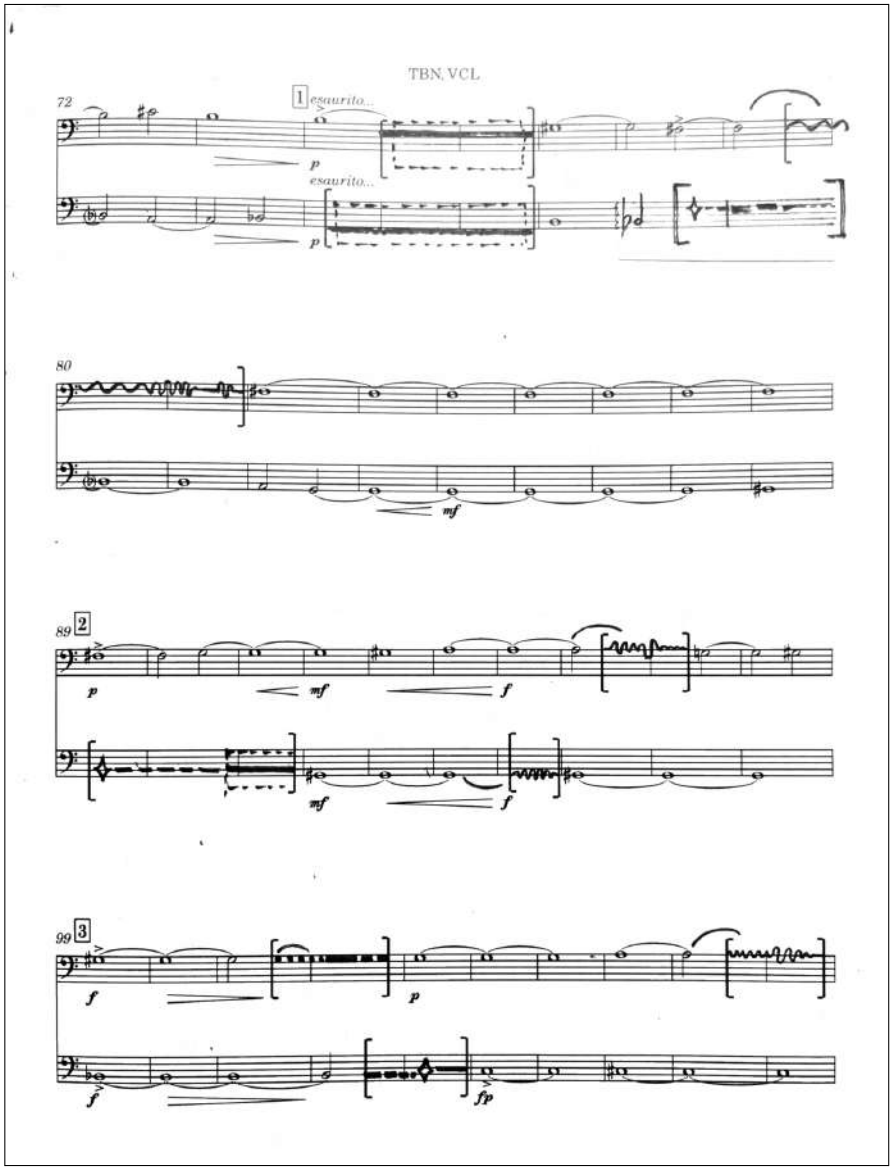
sostanza come il sangue

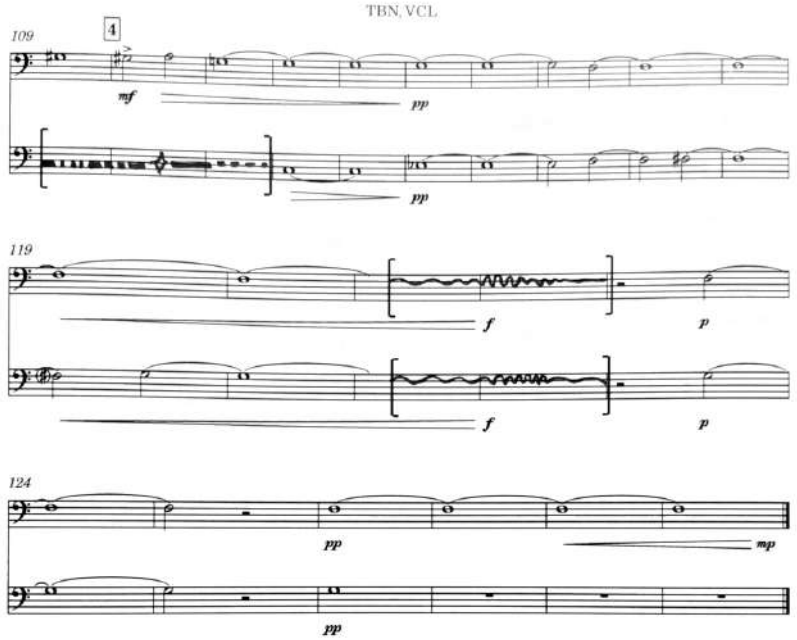
isaac otto

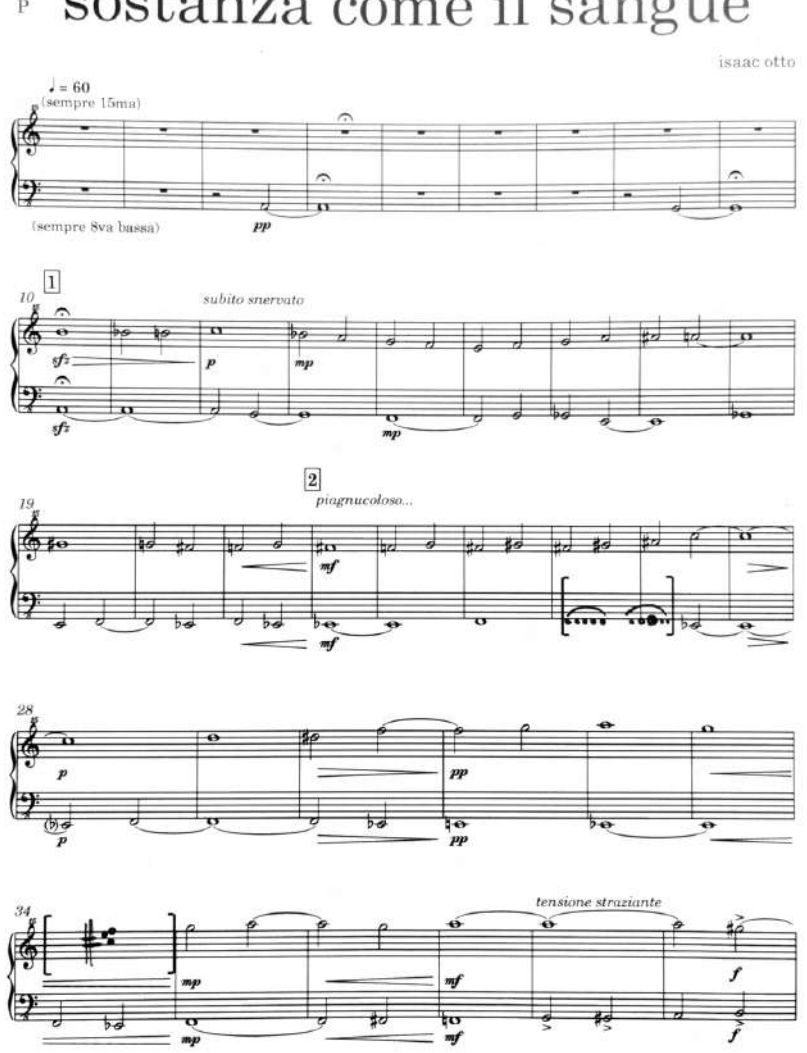


TBN
VCL


TBN, VCL
33
tensione straziante
mp
mf
f
tensione straziante
mp
mf
f
40
mp
mp
47
3
cuttee!
3 , 4 . . .
3 , 4 . . .
♩= 60
55
4
sfumato
pp
mp
sfumato
pp
mp
5
63
mp
f
mp
f


TBN, VCL
72
1
esaurito...
p
esaurito...
p
80
mf
89
2
p
mf
f
mf
f
99
3
f
p
f
fp


TBN, VCL
109
4
mf
pp
pp
119
f
p
f
p
124
pp
mp
pp


P
sostanza come il sangue
isaac otto
♩ = 60
(sempre 15ma)
(sempre 8va bassa)
pp
1
10
subito snervato
sfz
p
mp
sfz
mp
2
19
piagnucoloso...
mf
mf
28
p
pp
p
pp
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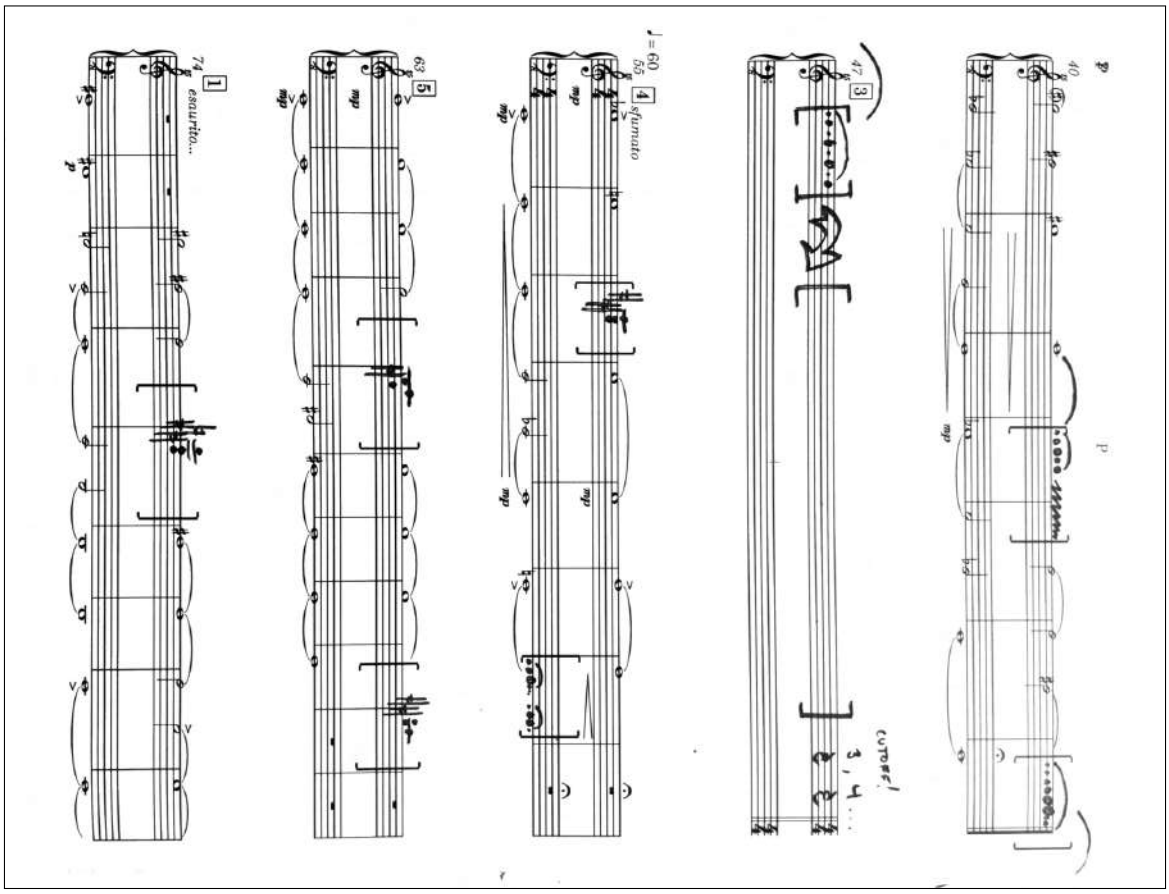
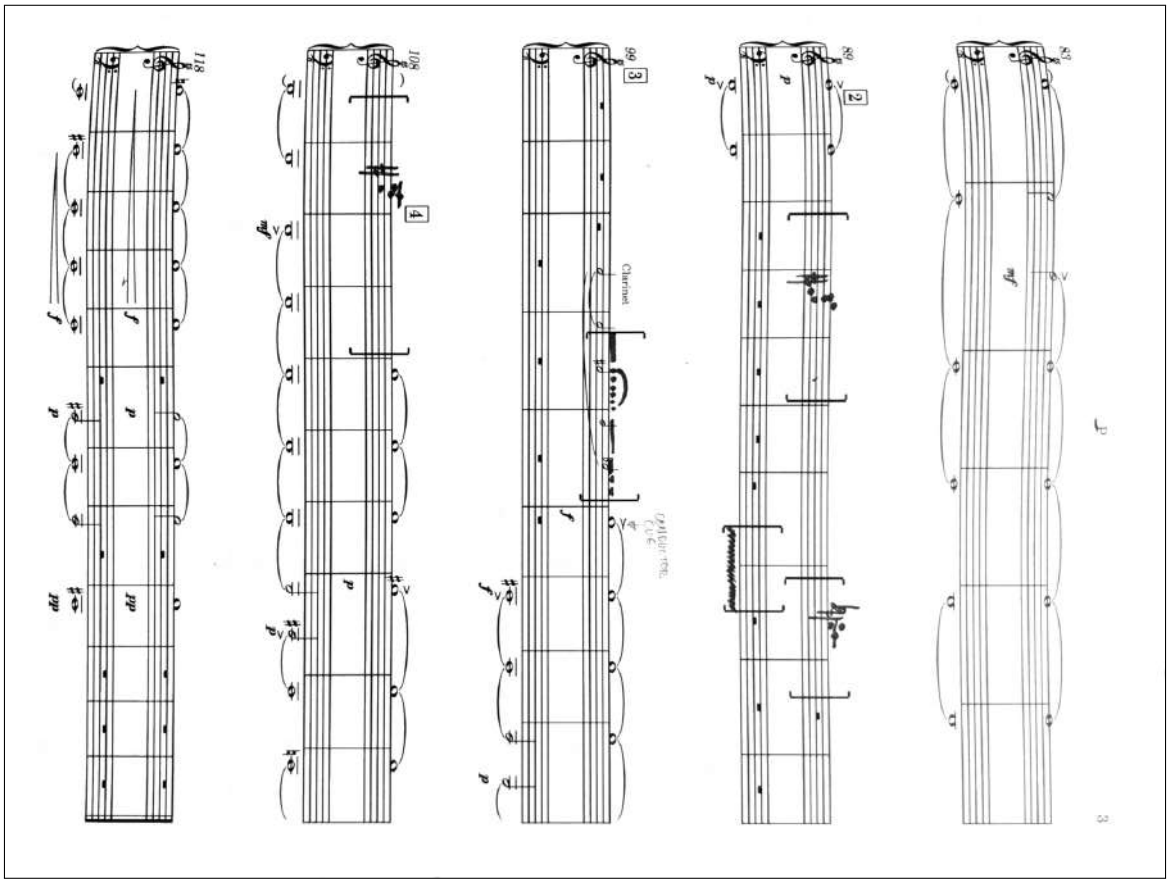
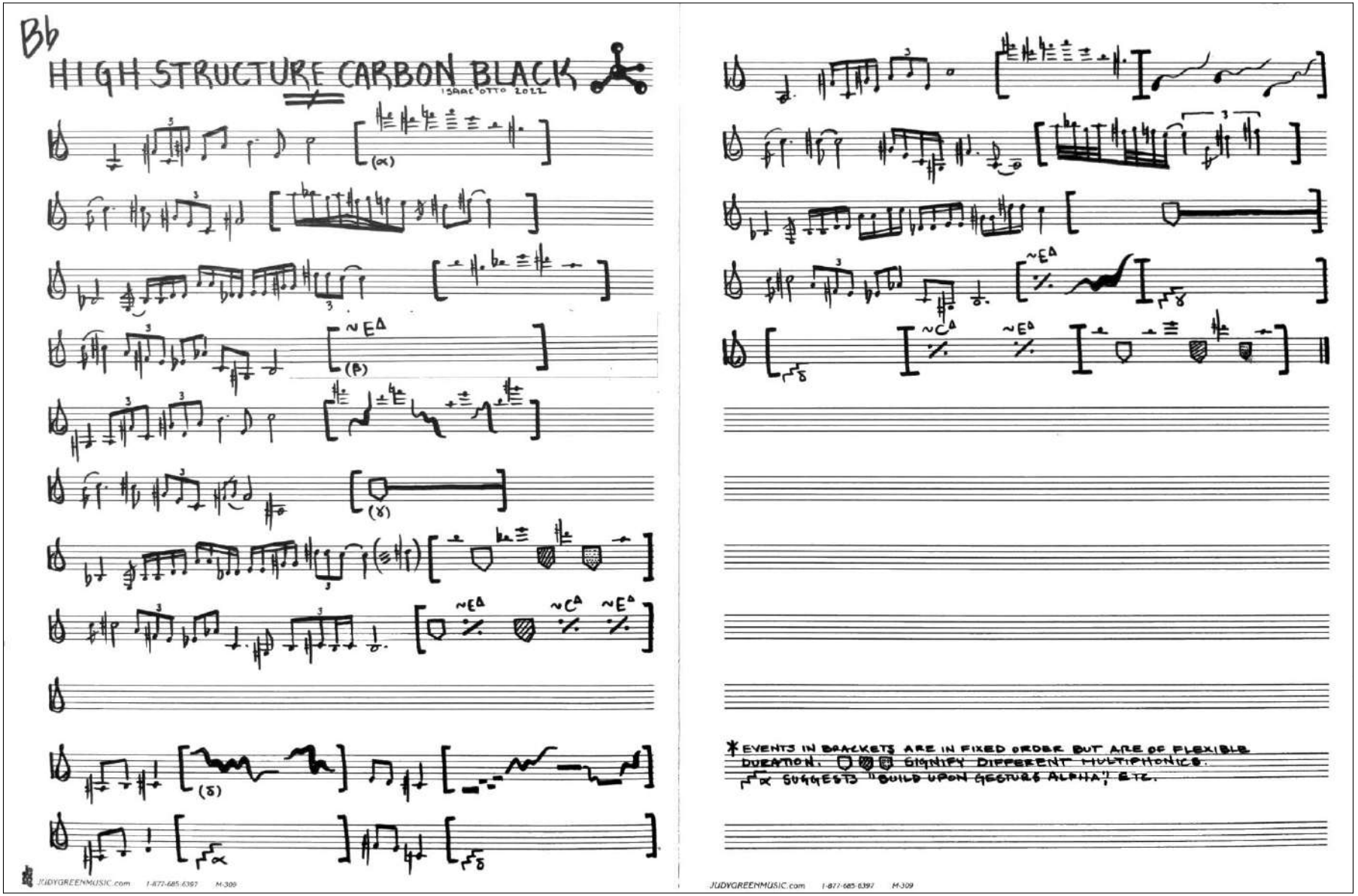




APPENDIX F

HIGH STRUCTURE CARBON BLACK (2023)


Bb
HIGH STRUCTURE CARBON BLACK
ISAAC OTTO 2022
(α)
(β)
(γ)
(δ)
~E^Δ
~C^Δ
~E^Δ
~E^Δ
~C^Δ
~E^Δ
*EVENTS IN BRACKETS ARE IN FIXED ORDER BUT ARE OF FLEXIBLE DURATION. ▢ ▨ ▩ SIGNIFY DIFFERENT MULTIPHONICS.
𝆏α SUGGESTS "BUILD UPON GESTURE ALPHA", ETC.
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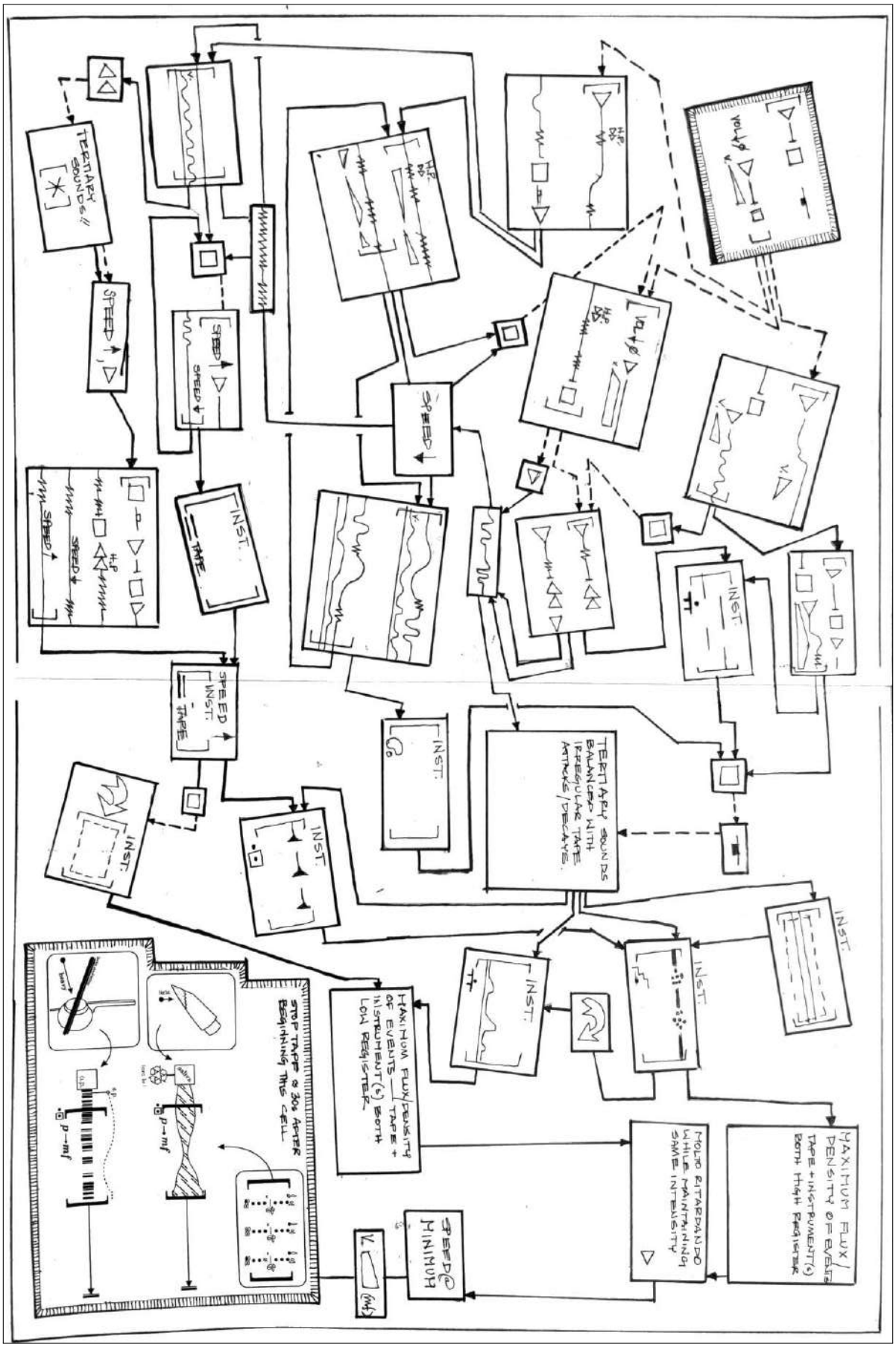
APPENDIX G

NEMAT-SPACE (2023)


TERTIARY SOUNDS //
SPEED
INST.
TAPE
HP
VOL
TERTIARY SOUNDS BANDED WITH IRREGULAR TAPE ATTACKS / DECAYS.
MAXIMUM FLUX / DENSITY OF EVENTS + INSTRUMENT(S) BOTH HIGH REGISTER
MAXIMUM FLUX / DENSITY OF EVENTS — TAPE + INSTRUMENT(S) BOTH LOW REGISTER
HOLD RITARDANDO WHILE MAINTAINING SAME INTENSITY
SPEED MINIMUM
STOP TAPE @ 30% AFTER BEGINNING THIS CELL
p → mf