

Historicized Composition and Creative Ethnomusicology¹

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This paper investigates relationship between compositional and ethnomusicological research. The method of historicized composition developed out of my work as a chant scholar, as ongoing ethnomusicological research has had a profound influence on my compositional work. Understanding and underscoring historical and phenomenological relationships between music and language, the act of composition becomes a creative discovery of relationships between musical material and music history.

Relationships between music and language were the focus of my PhD thesis completed at Princeton University in 2004.³ My dissertation consisted of a study of Hungarian laments, Jewish Torah recitation, and Christian plainchant. After writing my dissertation I transferred and extended my knowledge of chant to include Islamic Qur'an recitation. This research affected the way I compose, establishing a deeper sense historical consciousness in terms of approaching musical material.

My investigations commenced with the study of a Hungarian folk song, the *sirató*, a lament sung by women in traditional village communities of Hungary. The *sirató* records back to the Middle Ages and lamenting by women was common already in Biblical times.⁴ This song-type is integral for my

¹ Title of talk given at the 1st International Symposium of New and Computer Music at the at the Escola de Música e Belas Artes do Paraná in Curitiba, Brazil on December 3, 2012. Many thanks go to Felipe de Almeida Ribeiro for inviting me to the symposium. "Creative Musicology" has been discussed by Akin Euba in "Text Setting in African Composition," *Research in African Literatures* 32/2 (Summer 2001). Some parts of this text have appeared in previous lectures and essays.

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³ Dániel Péter Biró *Reading the Song: On the Development of Musical Syntax, Notation and Compositional Autonomy: A Comparative Study of Hungarian Siratók, Hebrew Bible Cantillation and Ninth Century Plainchant from St. Gallen*. Composition: *Mishpatim (Laws) Part I*, for Speaking Percussionist, Voices and Ensemble. Defended in July 2004

⁴ Zoltán Kodály, *Folk Music of Hungary* (Budapest: Corvina Press, 1960) 76, "Mourning songs for the dead also go back to primitive times. Although every religion and secular form of legislation (e.g., Solon's) has endeavoured to control mourning practices, they are still customary even today." Gisela Suliteanu has written about laments performed by women in ancient Israel, citing from the book of Genesis: Gisela Suliteanu, "The traditional System of Meloepic Prose of the Funeral Songs recited by the Jewish Women of the Socialist Republic of Rumania," *Folklore Research Center Studies*, Issachar Ben-Ami, ed. (1972: Jerusalem, Magnes Press) 292, "Sara died at Kiriath-Arba, namely Hebron in the land of Canaan and Abraham came to lament over Sara and to cry for her" (Gen. XXIII: 2), constitutes the first evidence of funeral songs among the Jewish people. The phrase "and Abraham came to lament (*lipsod*) over Sara and to cry for her (*velivkotah*), indicates with precision that there existed at the time in the course of the funeral ceremony two kinds of manifestations: the "crying" and the "lament. Thus we can interpret the "crying" as an individual and personal manifestation and the "lament" as a manifestation already ceremonial according to certain rules prescribed by the community."

study, as it exemplifies an inherent relationship between speech, singing, noise and pattern. Such an investigation was central to the theme of how musical language is determined collectively.

I began my investigations of the *sírató* as a researcher at the Academy of Science in Budapest, Hungary in 1995. At that time, my main objective was to understand the rhythmic and melodic patterns within the variational strophe structures of *síratók* (plural for *sírató*) and to examine how these patterns related to those of Hungarian speech. Having access to the collection of recordings in their archive, I ran across the recording of Mrs. János Zóka. Recorded in the 1970s, this recording gives posthumous voice to a woman in the region of Somogy, southern Hungary, who mourns her daughter's premature death. I was immediately fascinated by her lament, by the fact that Mrs. János Zóka began her lament by speaking and how, in the course of her lament, her speaking transformed into singing.

Because her lament had not yet been transcribed into notation, I set about to write it down in order to better understand its phrasal, rhythmic and modal structure. I discovered that the spoken sections of her lament acted as a rhythmic and gestural skeleton for her later singing. Nonetheless, her singing transforms prose-like speaking into structured musical poetics. The task of understanding such dichotomies between improvisation and musical form, musical prose and musical poetics, as is found in *sírató* of Mrs. János Zóka, informed much of my ensuing theoretical, musicological and compositional undertakings.

At the Hungarian Academy of Science, I met László Dobszay, who studied the historical context of the *sírató* in his book “*A sírató dallamköre zenetörténetünkben és népzeneinkben.*” (*The Melodic Context of the Lament as Displayed in Our Music History and Folk Music*).⁵ In this book, Dobszay demonstrates not only how the *sírató* relates to other types of Hungarian folksong but also how modal elements of the *sírató* resemble those of plainchant. This work motivated me to think about how such relationships between folk music and Christian liturgical music were created.

A year later, I traveled to Bucharest, Rumania to meet Gisela Suliteanu, a pioneer of Jewish music research in Rumania. Bob Cohen, a researcher of Jewish music in Budapest, had told me that Suliteanu had examined a type of Jewish lament called the *tehinot*. Reading her article *The Traditional System of Meloepic Prose of the Funeral Songs Recited by the Jewish Women of the Socialist Republic of Rumania*⁶ allowed me to consider how elements of folk music entered into the world of Jewish liturgy and to contemplate the relationships between oral, semi-oral and written musical cultures.

In order to better understand the structure and functionality of Jewish liturgical music, I traveled to Israel in 1996. In Israel, I was able to collect recordings of Torah cantillation from the Feher Music Center at the House of the Diaspora in Tel-Aviv. After the destruction of the second temple in 70 C.E. the primary function of Jewish liturgical music was to serve the sacred text: the tonal order of Torah cantillation exists not for spontaneous declamatory purposes but as a way to remember and organize the original text, to make the text aurally comprehensible. Musical patterns existed in the world of Torah chant both as a supplementary function to memory and to make textual syntax comprehensible. Nonetheless, the liturgical function of this singing was to add life to the bones of the consonant-based written Hebrew language, by combining these bones with the flesh of sung vowels. In Europe as elsewhere, the modal framework of a given Jewish community's tropes was shaped by the parameters of the larger musical context of the surrounding cultures. Transcribing these recordings, I was able to categorize the liturgical, regional and individual differences that exist within Torah cantillation; I began to speculate about those elements of Torah cantillation that form musical identities

⁵ László Dobszay, *A Sírató dallamköre zenetörténetünkben és népzeneinkben* (Budapest: Akadémia Kiadó, 1983)

⁶Gisela Suliteanu, “The Traditional System of Meloepic Prose of the Funeral recited by the Jewish Women of the Republic of Rumania,” *Folklore Research Center Studies*, Issachar Ben-Ami, ed. (1972: Jerusalem, Magnes Press)

and those which act to provide musical variation. I also began to compare these variational possibilities that arise within a culture in which verbal tradition is transmitted textually, like that of Torah trope, to a culture in which verbal tradition is transmitted orally and aurally, like that of the Hungarian *sírató*.

Beginning my studies at Princeton University in 1999, I was able to attend Peter Jeffrey's chant seminars. Motivated by his teaching, I started to contemplate questions of notational development and how musical syntax related historically to textual syntax in early Christian musical practice. Investigating some of the earliest chant repertoire, the *Einsiedeln Codex 121* from the 9th century, I was perplexed not only by the precise notational functionality of such "simple" notation, but also by the larger questions that this ancient notation asks of the beholder: what did this sound like when the notation was written? How was plainchant influenced by regional folk music? What was sung before the development of such notation? From where did the melodies derive? How did the melodies change after the implementation of notation? And finally, how does such notation compare to that of Torah cantillation? Using the plainchant text as a point of departure, I started to examine the syntactical function of the neumes and to see how they relate to the syntactical functionality of the Jewish Torah cantillation signs or *te'amim* (Hebrew: תְּעִמִּים). Recalling a 1997 lecture of Godehard Joppich at the Musikhochschule in Frankfurt, Germany, in which Joppich discussed how syntax operates in plainchant, I began to read his essay, "Die rhetorischen Komponente in der Notation des Kodex 121 von Einsiedeln."⁷ Observing Joppich's view of syntax with that of theorists of Torah trope, such as Aron Dotan,⁸ Joshua R. Jacobson⁹ and Hanoch Avenary,¹⁰ I could compare and contrast how syntax functioned in both chant types as well as how the chant traditions of two religions might have affected each other.

Contrasting the prosaic functionality of plainchant notation with the poetic structuring of the neumes of the plainchant sequence,¹¹ I reflected on the larger questions of the technical development of notation and how this development was key to the development of compositional subjectivity and musical autonomy. The sequence differs from the standard plainchant repertory, as it consists of a textless melisma to which words are added, allowing for a poetically formed fusion of text and music. Examining theories of Richard Crocker,¹² Andreas Haug¹³ and Calvin M. Bower¹⁴ I began to comprehend both the structural and historical interrelationships between sequence text and sequence melody as well as how the functionality of notation transformed in this new form.

Comparing the functionality of musical syntax in the *sírató*, Torah cantillation and plainchant to that of the sequence immediately brought up questions in regard to how musical syntax responds textual and musical hierarchies. Contrasting the interrelationships of memory and notation in Torah

⁷ Godehard Joppich, "Die rhetorischen Komponente in der Notation des Kodex 121 von Einsiedeln," *Codex 121 Einsiedeln, Kommentar zum Faksimile* (Wienheim: VCH Verlagsgesellschaft, 1991)

⁸ Aron Dotan, *Prolegomena*, William Wickes, *Two Treatises on the Accentuation of the Old Testament*, (New York: Ktav Pub. House, 1970) IIV.

⁹ *Chanting the Hebrew Bible - The Art of Cantillation*, The Jewish Publication Society, Philadelphia, 2002, 373

¹⁰ Hanoch Avenary, *The Ashkenazi Tradition of Biblical Chant Between 1500 and 1900*, (Jerusalem: The World Congress on Jewish Music, 1978)

¹¹ Richard L. Crocker: "Sequence," *Grove Music Online*, ed. L. Macy (March 19, 2013) <http://www.grovemusic.com>, "A category of medieval Latin chant (also called Prosa or 'prose') which flourished from about 850 to 1150. Throughout that period both its musical and literary importance were great; and from about 850 to 1000, when the large repertories were firmly established, the sequence represented one of the most important kinds of music produced in the West – important because of its intrinsic musical values as well as its historical significance for the development of style in general."

¹² Crocker, *An Introduction to Gregorian Chant* (New Haven: Yale University Press, 2000) and *The Early Medieval Sequence*, (Berkeley: University of California Press, 1977).

¹³ Andreas Haug, "Der Sequentiartheil des Codex Einsiedeln 121," *Codex 121 Einsiedeln, Kommentar zum Faksimile* (Wienheim: VCH Verlagsgesellschaft, 1991)

¹⁴ Calvin M. Bower, "An Alleluia for Mater," *Essays on the Music of J.S. Bach and other Divers Subjects*, (Louisville: University of Louisville, 1981)

cantillation, plainchant and in the plainchant sequences raises issues about the origins of composition and musical autonomy. While scholars can only hypothesize about the chronological stages within the development of the sequence as a musical form, closer speculation of the mystery of its production process allows one to better appreciate the dominant historical relationships among and functionality of music, text and notation.

As a composer, this research made me very alert to contemporary problems of text and music and text *as* music. At Princeton University the factual investigations of Peter Jeffrey were juxtaposed and complemented by the speculative teachings of Peter Schäfer on Jewish Merkava¹⁵ mysticism and Talmud¹⁶ in the Department of Religion. Kabbalistic methods of gematria¹⁷ were developed to find

¹⁵ “Merkava,” *Britannica Student Encyclopedia*. 2013. *Encyclopædia Britannica Online* (Marc 7, 2013) <http://www.search.eb.com/eb/article?eu=53449>, “also spelled Merkabah (Hebrew: “Chariot”), the throne, or “chariot,” of God as described by the prophet Ezekiel (Ezekiel 1); it became an object of visionary contemplation for early Jewish mystics. Merkava mysticism began to flourish in Palestine during the 1st century AD, but from the 7th to the 11th century its centre was in Babylonia. Merkava mystics probably experienced ecstatic visions of the celestial hierarchies and the throne of God. In Merkava mystical literature the ascent of the visionary's soul is described as a perilous journey through seven spheres, or “heavenly dwellings,” manned by hostile angels. The visionary's goal was to behold the divine throne situated on its chariot. Merkava mysticism was strongly influenced by Gnostic beliefs. Merkava initiates (tzenu'im), limited to a select few with specific moral qualities, were required to prepare themselves by fasting. A successful visionary journey depended, in part, on the use of certain magical formulas (called seals) that were used to placate the angelic gatekeeper of each heavenly dwelling. The use of an incorrect seal could result in severe injury or a fiery death. The Talmud warns that among four men who engaged in Merkava, one died, one went mad, one apostatized, and only Rabbi Akiba ben Joseph had a true visionary experience. Those who practiced Merkava were sometimes called Explorers of the Supernatural World (Yorde Merkava); Gershom Gerhard Scholem, a modern Jewish scholar of mysticism, suggests that the words may have implied a descent into the depths of self. The oldest literary sources of the movement are two hekhalot texts: the “Lesser” attributed to Rabbi Akiba, the “Greater” to Rabbi Ishmael ben Elisha. The Book of Enoch and the Shi'ur qoma (“Divine Dimensions”) belong to this same tradition. The latter contains highly exaggerated anthropomorphic descriptions of God.”

¹⁶ “Talmud.” *Britannica Student Encyclopedia*. 2013. *Encyclopædia Britannica Online* (May 20, 2013) <<http://www.search.eb.com/ebi/article?eu=299394>>. The basic scripture of Judaism is the Hebrew Bible, the most significant portion of which is the first five books. Because these books contain the laws of Moses, they are usually referred to collectively as the Torah, or Law. Ancient Israel, however, had many other laws, customs, and traditions not found in the Torah. Many of the unwritten laws were as old as, perhaps even older than, the written ones. Unlike the written laws, which remained unchanged over the centuries, the unwritten, or oral, ones could be modified as historical circumstances required. In the course of several hundred years, Israel accumulated a large store of oral law and tradition. In the period of the 1st and 2nd centuries AD, it was felt necessary by the rabbis—the leaders and teachers of Judaism—to commit this vast body of oral tradition to writing. The result of this effort, which took several centuries to complete, is the Talmud. As a commentary on, and supplement to, the written law, the oral tradition added a dynamic quality, making it possible to shape the law to different times and places as the Jews were dispersed throughout the civilized world. Because the Talmud represented the heart of their ancient traditions, it also served as a unifying force that went beyond geographical boundaries and language differences. The word Talmud means “learning,” or “study.” In the broadest sense the Talmud is not one book but a set of books. The primary section is the Mishna—meaning “repeated study”—the code of religious and civil laws governing society. Because the several sections of the Mishna were compiled over a long time, there are inconsistencies both in language and in meaning. By the time of compilation, the laws in the Mishna had come to be recognized as absolute. It is probable that the final writing and compilation of the Mishna occurred early in the 3rd century AD under the authority of Rabbi Judah ha-Nasi, head of the Jewish community in Palestine. Judah spent about 50 years sifting through the whole oral law, which was then compiled into six sections, or orders, dealing with all the facets of daily life. These included civil law, ritual purity, festivals, marriage, the temple service, and agriculture. In doing his work Judah was careful to determine which laws were backed by rabbinic authority, but he also preserved minority opinions in case laws were changed at some future date and needed acceptable examples to back them up. Once completed, the Mishna attained a status in Orthodox Judaism second only to the Torah itself. The Mishna soon became the subject of commentaries by scholars both in Palestine and in Babylonia, the two leading centers of Judaism. These commentaries became known as Gemara, meaning “completion.” Each Gemara, along with the Mishna, makes up a separate Palestinian and Babylonian Talmud. Begun by students of Judah ha-Nasi in the 3rd century, the two Gemara were not completed until early in the 6th century. Work on the Gemara was done by scholars in various academies known as yeshivas in both Palestine and Babylonia. Schools that teach the Torah and Talmud and other rabbinic learning are still called yeshivas. By the end of the 4th century, Palestine had become a largely Christian area, and the academies ceased to exist. Compilation of the Palestinian Talmud, therefore, came to an end. The work in Babylonia, however, went on, and it is this Talmud that became the standard text of Jewish law and religion. By orthodox believers it is considered divinely inspired, and in modern yeshivas it is still a major object of study. The subject

additional meanings in text via numerological decoding. Such methods were employed within music of the middle ages, and extending such possibilities of employing gematria as a structural device to direct musical language fascinated me. In Hebrew, each letter possesses a numerical value. Gematria is the calculation of the numerical equivalence of letters, words, or phrases, and, on that basis the exploration of the interrelationship between words, ideas and, in my compositions, musical sounds.

In 2001, I started to investigate possibilities to create systems of musical syntax and metaphor by means of the numerological equivalents of the Hebrew text. During my residency, I was able to finish preliminary work for my composition for speaking percussionist entitled *בְּמִצְרַיִם* (*BeMitzraim – In Egypt*). This composition was my first in experimental investigations into the relationship between written text and music by means of gematria.

Out of this composition grew my larger work for ensemble entitled *מִשְׁפָּטִים* (*Mishpatim – Laws*).¹⁸ The text of *Mishpatim* (Hebrew for “laws”) consists of rules given to the Israelite people and this text forms the basis for the composition.¹⁹ Written in the years 2003–2013, the work is in seven parts and approximately two hours in duration. In creating this piece I incorporated gematria both as a device to structure rhythm, pitch, dynamics and timbre as well as to help me interpret the text by means of musical interpretation: all of the pitches, rhythms and techniques are derived from or are reactions to sections of *Mishpatim*.

matter of the Talmud is divided into two types: law (Halakah) and narrative (Haggadah). The law deals with the ritual, legal, and doctrinal aspects of the Torah, and it shows how the laws should be applied even to the most ordinary situations of daily life. The narrative portion covers the nonlegal parts of the Hebrew Bible, illustrating the biblical stories and exploring their ideas. Other parts of the Haggadah contain stories, legends, and proverbs that convey moral messages. Because the scholars who worked on the Talmud were learned men in many areas, there is material on topics as diverse as architecture, astronomy, astrology, ethics, natural sciences, mathematics, geography, history, magic, medicine, and theology.”

¹⁷ “Gematria,” *Encyclopædia Britannica*, 2013, *Encyclopædia Britannica Online* (March 7, 2013) <http://www.search.eb.com/eb/article?eu=37039>, “the substitution of numbers for letters of the Hebrew alphabet, a favourite method of exegesis used by medieval Kabbalists to derive mystical insights into sacred writings or obtain new interpretations of the texts. Some condemned its use as mere toying with numbers, but others considered it a useful tool, especially when difficult or ambiguous texts otherwise failed to yield satisfactory analysis. Genesis 28:12, for example, relates that in a dream Jacob saw a ladder (Hebrew *sullam*) stretching from earth to heaven. Since the numerical value of the word *sullam* is 130 (60 + 30 + 40)—the same numerical value of Sinai (60 + 10 + 50 + 10)—exegetes concluded that the Law revealed to Moses on Mount Sinai is man's means of reaching heaven. Of the 22 letters in the Hebrew alphabet, the first ten are given number values consecutively from one to ten, the next eight from 20 to 90 in intervals of ten, while the final four letters equal 100, 200, 300, and 400, respectively. More complicated methods have been used, such as employing the squares of numbers or making a letter equivalent to its basic value plus all numbers preceding it.”

¹⁸ Written for the Ensemble SurPlus, the first movement of the cycle was performed at the Akademie Schloss Solitude, Germany in 2003. This was my initial attempt to incorporate gematria for musical translation: all of the pitches, rhythms and techniques are derived from or are reactions to sections Exodus Chapter 23. An analysis and accompanying CD of the first movement of *Mishpatim* was published by the American journal *Perspectives of New Music*. *Mishpatim* cycle was continued in four recently commissioned projects: *Mishpatim (Laws) III – Tslalim Reulim (Masked Shadows)* was commissioned by the Aventa Ensemble and funded by the Canada Council for the Arts and was performed throughout Canada in April 2010. *Mishpatim (Laws) IV Hadavar* and – V *Ko Amar (Thus Said)* was commissioned by the SWR (German Radio) and premiered at the German Radio (SWR) by contralto Noa Frenkel, the Ensemble Surplus, and the Experimental Studio, performed as part of the Freiburg Mehrklang Festival in May 2010. *Mishpatim (Laws) Part VI – Gam Zera (Also the Seed)* was premiered by Noa Frenkel, Ensemble Surplus and the Experimental Studio at New Music Concerts on January 12, 2013. The composition *Mishpatim (Laws) VII Bahar (On the Mountain)* was commissioned by the Center for Art and Media in Karlsruhe, Germany and will be performed in their Imatronic Festival in November 2012.

¹⁹ The *Mishpatim (Laws)* cycle responds to the parsha, or weekly portion, from the Hebrew Bible entitled *Mishpatim* (Exodus 21:1–24:18), which deals with various religious, legal, ethical and cultic regulations of the early Israelites. Within the text, recurring decrees appear regarding the treatment of the disadvantaged and those on the periphery of society. Some historians have suggested that parts of the text were lost, while others were later inserted, as these regulations are not organized in any clearly discernible order. See Boaz Cohen, *Jewish and Roman Law: A Comparative Study* (New York: Jewish Theological Seminary of America, 1966) and Bernard S. Jackson, “Evolution and Foreign Influence in Ancient Law,” *The American Journal of Comparative Law* 16, no. 3 (Summer 1968): 372–90.

This research was continued in 2006, as I was awarded a Faculty Fellowship from the University of Victoria Centre for Studies in Religion and Society. At the University of Victoria this research is a central part of my teaching. This “Seminar in Music Notations” MUS 501 examines the interchange of music and text as well as the presupposition that musical languages have a direct link to spoken and written language including relationships between the “spoken” and “sung” as well as the “read” and “written” word. In addition, I have also lectured on Jewish cantillation and the history of chant in Canada, Germany, Israel, Holland, and the United States. The outcome of this research has been presented in numerous peer-review conferences and publications.²⁰

In 2011 I was Visiting Professor at the Department for Information and Computer Science of the University of Utrecht, Netherlands. There I was able to work on an important research project dealing with oral culture in the Netherlands. In this project, which involved scholars of musicology and computer science, similarity measures for melodies from oral traditions were developed, especially designed for the monophonic chant repertoires that are a main part of my research focus. In Holland I made field recordings in Jewish and Muslim communities analyzed the resulting recorded data through computational means. Guiding researchers and students in analysis and programming, I supervised the project done in the Department for Information and Computer Science and the Meertens Institute, Amsterdam. We developed software and interface components to analyze melodic gestures as found in Dutch Torah Trope and Qur’an recitation as performed by Indonesian immigrants to the Netherlands.²¹ This project is ongoing as we are currently expanding our repertoire to include other chant traditions outside Holland.

My research has taken me a long way from my first encounters with the *sírató* in 1995. But in essence I have come full circle: while I continue to study the beginnings of a music that derived from text, I also investigate sound by attempting to reinterpret it as (hopefully new) text. The inherent contradiction of these undertakings stems from my belief that just as one can take no historical truth for granted, and as research is only able to move toward a historical truth like an arrow toward a moving target, a composer today can not take the act of composing, not to mention the employment of notation, or musical material for granted.

The Nature of Musical Material

Musical material presents the listener with a dialectical relationship in regard to sonorous and linguistic comprehension, as it serves to be both syntactically and structurally decoded by the listening

²⁰ Dániel Péter Biró, Steven R. Ness, and George Tzanetakis: “Computer-Assisted Cantillation and Chant Research Using Content-Aware Web Visualization Tools,” in *Multimedia Tools and Applications* (2009). “Decoding the Song: Histogram-Based Paradigmatic and Syntagmatic Analysis of Melodic Formulae in Hungarian Laments, Torah Trope, 9th Century Plainchant and Koran Recitation,” proceedings of the *Agora Expressivity in Music and Speech at IRCAM, Institut de Recherche et Coordination Acoustique/Musique in Paris France on July 17-18, 2008*: (http://recherche.ircam.fr/equipes/analysesyntese/EMUS/AGORA/abstract_poster/Biro_poster_EMUS_AGORA.pdf). “Decoding the Song: Histogram-Based Paradigmatic and Syntagmatic Analysis of Melodic Formulae in Hungarian Laments, Torah Trope, Tenth Century Plainchant and Qur’an Recitation” Lecture at USMIR Conference at Utrecht University, August 4, 2010. “Ein theologischer Regenbogen: zur Aktualität geistlicher Musik” – lecture given at the International Messiaen Week in Neustadt an der Weinstrasse, Germany on August 17, 2008.

²¹ This research has resulted in a joint journal paper about computational modeling of the relations between various chant traditions: D.P. Biró, P. van Kranenburg, S.R. Ness, G. Tzanetakis, and A. Volk. “Stability and Variation in Cadence Formulas in Oral and Semi-Oral Chant Traditions – a Computational Approach.” *Proceedings of the 12th International Conference on Music Perception and Cognition and the 8th Triennial Conference of the European Society for the Cognitive Sciences of Music*. Thessaloniki. 2012. 98 105 and P. van Kranenburg, D.P. Biró, S.R. Ness, and G. Tzanetakis. “A Computational Investigation of Melodic Contour Stability in Jewish Torah Trope Performance Traditions”. *Proceedings of the 12th International Society for Music Information Retrieval Conference*, Miami, 2011. p. 163-168.

subject. As music passes in time its linear form is heard as syntactical divisions, while larger structural occurrences can be perceived as remembered, in non-linear manner.²² In monotheistic cultures such dichotomy was historically pre-determined, as the musical sign developed in coordination with sacred text.²³

As music separated itself from the religious word, the shadow of text became longer as in the same measure that the abstract, sounding sign became stronger: music became a hermeneutical activity.²⁴ With the Enlightenment, listeners' expectations changed, as did the interpretive communities and the nature of the sonorous signifier. In the course of the 18th century, composers gained economic and expressive autonomy, they endeavored to create sonorous signs that would be recognized as part of a difficult, higher discourse that demanded further reflection and learning, transforming the listener from passive consumer of pre-existing forms to one of active exploration, discovering unknown musical realms.²⁵ The new music, in its form and content, existed not only to be passively enjoyed but also to be re-discovered, discussed, reinterpreted, re-contextualized, read, and mis-read. With the Enlightenment such striving became the basis for a musical culture in which a listening individual was given the opportunity to strive for 'self-enhancement,' *Selbstverwirklichung*, through musical education or *Bildung*.²⁶ The possibility for 'self enhancement' was inherently tied to the ability to respond to music that was challenging for both performer and listener: such progressive music needed edification, as it pointed to the possibility for *klingende Philosophie*, challenging pre-conceived notions of the goals and borders of musical language while moving forward to create new contexts for musical comprehensibility and incomprehensibility.

²² Kofi Agawu discusses such a temporal dichotomy in his book, *Music as Discourse: Semiotic Adventures in Romantic Music* (Oxford: Oxford University Press, 2010). I am grateful to him for the many insights he has given me into relationships between music and text during our many discussions over the years.

²³ This evolution also has a pre-history that began with ritual. The historical relationships between ritual, text, and hermeneutic interpretation is best described by Jan Assmann in *Das kulturelle Gedächtnis* (München: C.H.Beck, 1992), 17. "The more rites follow a strict order, the more the aspect of repetition can predominate. The more the rites allow for freedom of individual celebration, the more the aspect of representation comes to the foreground. With these two poles, within which text [Schrift] becomes significant as a connective structure among cultures, the scope of such a dynamic is circumscribed. Related to this development from oral transmission to text is the gradual transition from the dominance of repetition to the dominance of representation, from ritual to textual coherence. Therein occurs a new connective structure. The binding power of this new structure is not imitation and conservation but interpretation and memory. Hermeneutics replaces liturgy." (English translation by the author)

²⁴ See Kenneth Levy, *Gregorian Chant and the Carolingians* (Princeton: Princeton University Press 1998), 137. "The church musicians who opted for the inexact aides-mémoire of staffless neumes – for skeletal notations that ignored exact pitch-heights and bypassed many nuances – were content with incomplete representations of musical substance because the full substance seemed safely logged in memory. This simple calculus of notation and memory says that the Gregorian chants from their first neumatation were no longer 'improvised,' that few if any options were left for the strategies and vagaries of individual performers. The chants were "concretized reified entities," recognizable in their specific melodic dress, integrally stored and reproducible from memory."

²⁵ See Carl Dahlhaus, *The Idea of Absolute Music*, trans. Roger Lustig (Chicago/London, 1989; originally published in Kassel, 1978), as well as Daniel Chua, *Absolute Music and the Construction of Meaning* (Cambridge: Cambridge University Press, 1999).

²⁶ Both concepts became pillars of the Protestant church reformation and development of modern capitalism; see Max Weber, *Die protestantische Ethik und der Geist des Kapitalismus* (Bodenheim: Athenäum Hain Hanstein, 1993). Since the classical era the concept of 'self-enhancement' was tied to the concept of 'difficulty.' In response to his critics' definition of his music as excessively difficult, Beethoven opined that such musical 'difficulty' was an important aspect of musical performance and reception. Writing to his publisher Sigmund Anton Steiner in regard to his Piano Sonata in A Major op. 101, he stated "[...] 'difficult' is a relative term, for what seems difficult to one person will seem easy to another, and thus the term says nothing at all [...] but viewed in a different light [...] the term says everything, for whatever is difficult is also *beautiful, good, great*, and so forth [...]" Ludwig van Beethoven, letter no.1061 (January, 1817) in *Ludwig van Beethoven: Briefwechsel, Gesamtausgabe*, ed. Sieghard Brandenburg (München: G. Henle Verlag, 1996), 8, [henceforth BG], as translated by Brandenburg in Ludwig van Beethoven, *Ludwig van Beethoven Klaviersonate A-dur opus 101: Faksimile nach dem Autograph im Besitz des Beethoven-Hauses Bonn* (München: Henle, 1998), xviii. Many thanks to Jee Yeon Ryu for this citation.

Such a dialectical relationship between musical comprehensibility and incomprehensibility continues to determine the production and reception of musical material in the present time. Even today, within the secularized temple of new music, it might be possible to witness the mystery of that incomprehensible sacred sound, which, historically considered, derived from the comprehensible or incomprehensible sacred word.²⁷ While music has evolved since the Enlightenment to allow for an ever-increasing abstraction and redefinition of musical material, the composer also has the ability to investigate the multi-directionality of this trajectory via, what I have termed, “historicized composition.”

This methodology of “historicized composition” serves to address the historical nature of musical material via music composition. Within this methodology, composition exists as sonorous archeology; the discovery of the complexity of sound as an unstable, multifaceted object of culture, an unveiling of layers of history and meaning and, simultaneously, the creation of new contexts for musical perception. This appears to be a contradiction - the comprehension and preservation of that which is culturally and historically distant and its simultaneous modern transformation. Through knowledge, through the comprehension of history within musical material, sound is able to obtain the possibility to transcend its sonorous and formal existence - to become more than a historical object, articulated anew for individual expression. While in the current economic order musical material has become, by its very nature, a commoditized entity, the placement of sound within such a “historicized” framework serves to look backward across the various strands of music history and simultaneously forward toward the unknown. It is my hope that this simultaneous “remembering” and “abstracting” of the sonorous object might allow for a critique of the current “a-historicized,” pragmatic economic order and the subservience of music therein.

Such methodology of “historicized composition” was employed for the electro-acoustic composition of *Ko Amar (Thus Said)* (2008–2010).²⁸ The piece is based on the Hebrew *Haftarah*¹ text of *Mishpatim (Laws)*, a text that entails a complex historical existence. Within the composition *gematria*,²⁹ or Hebrew number symbolism, is employed to create structural relationships between the sacred word and musical structure. The study of musical syntax and phonetics, as found in practices of Jewish Torah trope and Islamic Qur’an recitation, was central to the composition, and allowed for the syntactical and phonetic structuring of musical material within the piece. Phonetic imitation, instrumentation and topics are employed to create textual musical analogies, while resonant instruments, in coordination with computer-based convolution, are used to investigate the concept of “negative space” in an electroacoustic context.

²⁷ In the course of history, the development of sacred languages, and their accompanying musical idioms for reading, recitation, and singing, created a hierarchy between sacred music for religious reflection and everyday music, unrelated to the sacred text.

²⁸ This composition was commissioned by Vancouver New Music and by the German Radio (SWR), made possible through composer commissioning grants from the British Columbia Arts Council and the Canada Council for the Arts. The first four movements were performed as *Kolot (Voices)*, premiered by Vancouver New Music with Giorgio Magnanensi conducting at the Scotia Bank Centre in Vancouver on Oct. 3, 2009. *Kolot (Voices)* is dedicated to Giorgio Magnanensi. The five-movement work *Ko Amar (Thus Said)* was premiered by the Ensemble Surplus and the Experimental Studio of the SWR with Detlef Heusinger conducting at the SWR in Freiburg on May 13, 2010.

²⁹ “Gematria,” Encyclopædia Britannica Online. Accessed March 7, 2013. <<http://www.search.eb.com>>: “The substitution of numbers for letters of the Hebrew alphabet, a favorite method of exegesis used by medieval Cabbalists to derive mystical insights into sacred writings or obtain new interpretations of the texts. Some condemned its use as mere toying with numbers, but others considered it a useful tool, especially when difficult or ambiguous texts otherwise failed to yield satisfactory analysis. Genesis 28:12, for example, relates that in a dream Jacob saw a ladder (Hebrew sullam) stretching from earth to heaven. Since the numerical value of the word sullam is 130 (60 + 30 + 40)—the same numerical value of Sinai (60 + 10 + 50 + 10)—exegetes concluded that the Law revealed to Moses on Mount Sinai is man’s means of reaching heaven.”

Music and Text – *Haftarah* and *Gematria*

All musical material in *Ko Amar (Thus Said)* relates back to the Hebrew *Haftarah* text of Jeremiah Chapter 33–34.³⁰ While melodic material derived from *Haftarah* cantillation played a central role in the first and last movements of the piece, musical structure and meaning is formed in accordance with the text. In this way, musical material serves to create an analogy to the ancient text.

This prophetic text exists in parallel with the *Torah* text of *Mishpatim (Laws)*. While *Mishpatim* deals with various religious, legal, ethical and cultic regulations of the early Israelites³¹ the parallel *Haftarah* text exists as warning to later generations what might occur if such rules, including those of debt release, as found in the *Torah* text, are not obeyed.³² The central themes of the text – relationships between economic slavery and freedom, destruction and redemption – are mirrored in terms of musical structure, form and material in the course of the piece.³³

In writing *Ko Amar (Thus Said)* I employed *gematria* to musically structure and interpret the Hebrew text. Within the system of *gematria*, each of the twenty-two letters of the Hebrew alphabet is assigned a corresponding number. Some letters are also assigned a separate number in the case when such a letter appears as a final letter in a given word. This is the same system through which medieval kabbalists conjured up hidden meaning from the Biblical text.

The numerical values, derived from the *Haftarah* text via *gematria*, exist to define the various musical parameters (pitch, intervals, rhythms, durations, instrumentation, articulation, plying techniques, electronic spatialization, and processing). The musical structures, created from the translation of text into numerical values that control musical parameters, allows for the formation of a dialogue between text and music and the creation of musical analogies.

Such parametric structuring via *gematria* can be found in the first movement *Hadavar (The Word)*, scored for contralto, piano, resonant gongs, and live electronics. In this movement, syntactical units are determined by the *Haftarah te'amim*. After each syntactical section a word of the following sentence is inserted (Jeremiah Chapter 34:9):

וַיְהִי דְבַר־יְהוָה אֶל־יְרֵמְיָהוּ מֵאֵת יְהוָה לֵאמֹר

„Then it was the word of the LORD came to Jeremiah from the LORD.“

Simultaneously, the resulting values – derived via *Gematria* from the *Haftarah* text – are integrated within a canon structure, which oscillates between voice and electronics.

³⁰ *Tanakh, The Holy Scriptures* (Philadelphia and Jerusalem: Jewish Publication Society, 1985).

³¹ Within the text, recurring decrees appear regarding the treatment of the disadvantaged and those on the periphery of society. Some historians have suggested that parts of the text were lost, while others were later inserted, as these regulations are not organized in any clearly discernible order. See Boaz Cohen, *Jewish and Roman Law: A Comparative Study* (New York: Jewish Theological Seminary of America, 1966) and Bernard S. Jackson, “Evolution and Foreign Influence in Ancient Law,” *The American Journal of Comparative Law*, 16, no. 3 (Summer 1968): 372–90.

³² David L. Lieber, et al. eds., *Etz Hayim, Torah and Commentary* (New York: Jewish Publication Society, 1999), 481, “The *parasha* and the *haftarah* are linked by their citation of rules that deal with the liberation of Hebrew slaves. The divine concern to limit debt bondage is an expression of the Bible’s overall concern for human dignity routed in economic freedom.”

³³ While Jeremiah’s prophecy deals with the final siege of Jerusalem in 588 B.C.E. the themes of economic bondage and ethics are exceedingly relevant today.

לשלח = 368
ויחי =
Haftarah
Trope
שא = 311
Canon = 3+3+6+1+1+8
רא = 401

Example 1

Within the canon structure, words of the *Haftarah* text become atomized into phonetic elements. In terms of musical form these phonetic elements obtain a musical logic, as the text is taken to a realm beyond *translatability*. While the compositional utilization of gematria and phonetic structuring was originally inspired by theological and mystical concepts of medieval Judaism, the actual phonetic structuring mirrors aspects of phonetic employment found in Qur’an recitation. In this way, religious chant, with its framework to structure syntax, pronunciation and meaning, becomes a main point of departure for the creation and understanding of musical material within the composition.

Reading Syntax, Reciting Phonetics

The Jewish *te’amim* or cantillation signs are indicators of melodic movement, their various combinations forming a coherent melodic code, functioning primarily to explicate textual pronunciation and syntax.³⁴ The structural possibilities of the *te’amim* remain “logogenic,” where the musical element is generated by the words, bonded to the verbal and syntactical structure, and subordinated to the communication of the text, with no attempt at musical autonomy.”³⁵ In the liturgical performance, the *ba’al hakorei* (“the owner of reading”)³⁶ embellishes the text with a melodic code, providing the framework to decode the textual syntax of the text by the reading religious

³⁴ There are 22 letters in the Hebrew alphabet. In the Torah scrolls only these letters are written: they function purely as “consonants” as their accompanying “vowels” were written only later by the Masorete rabbis in the period between the sixth and ninth century.

³⁵ Hanoth Avenary, “Masoretic Accents,” in *Encyclopedia Judaica* (Jerusalem: Keter Publishing Company, 1971), 1100.

³⁶ The root for the word *ba’al* entails both “owner” and “husband.” The root of the word *Korei* is the same as for *mikra* (qof-resh-alef) entailing the meanings “to read,” “to call” and “to name.”

community, for whom text, and not melody, is primary. Within the liturgical framework the melody sanctifies the text, just as the sung vowels sanctify the written consonants.³⁷

The following examples demonstrate the syntactical functionality of the *te'amim*.³⁸ The text of Genesis 24:34 allows for at least two if not three interpretations.³⁹

וַיֹּאמֶר עֶבֶד אַבְרָהָם אֲנֹכִי

“*Va-yomar eved Avraham anokhi*”

“And he said: I am a slave of Abraham.” This is the standard translation. Theoretically it could also mean:

- 1) “Abraham’s slave said, ‘It is I.’”
- 2) “And the slave said: I am Abraham”

The *te'amim* assure the correct semantic meaning; without the *te'amim* the text risks misinterpretation. Only when the placement of the disjunctive accent *etnahta* (◌) on the word וַיֹּאמֶר “*va-yomar*” (and he said) is combined with the conjunctive *mereha tipha* (◌◌) on the words עֶבֶד אַבְרָהָם “*eved avraham*” (slave / Abraham) can the correct meaning come to light, separating “and he said” from a connected “slave of Abraham:”

וַיֹּאמֶר עֶבֶד אַבְרָהָם אֲנֹכִי

“And he said: slave of Abraham [am] I.”

Example 2

While the practice of Torah reading was determined by the hierarchy of text and notation, the performance framework for Qur’an recitation is determined by rules of presentation that are primarily handed down orally.⁴⁰ Here the hierarchy of spoken syntax, expression and pronunciation play a major role in determining the vocal styles of *Tajwīd*⁴¹ and *Tarīl*⁴². The resulting melodic phrases, performed

³⁷ Lieber et al. eds., 441, “Jewish teachings maintained that the written word existed before the spoken word. For the Cabbalists the Torah existed even before the universe was created. There is also a disagreement of that what God said at Sinai. “What did the Israelites actually hear at Sinai? Some say they heard God proclaim all 10 of the utterances. Others say that God spoke only the first 2, declared the divine “I,” and that Moses added the remaining 8 in which God is referred to in the third person. One Hasidic master taught that the Israelites heard only the first letter of the first word (the alef in anokhi, which is a silent letter) and intuitively understood the rest (Menahem Mendel of Rymanov). That is, having encountered God in such a real and direct way, they understood the rightness and wrongness of certain modes of behavior without the need for words to be spoken.”

³⁸ See Heidi Zimmermann, *Tora und Shira: Untersuchungen zur Musikauffassung des rabbinischen Judentums* (Bern: Peter Lang, 2000), 144 as well as Joshua R. Jacobson, *Chanting the Hebrew Bible* (Philadelphia: The Jewish Publication Society, 1990), 22.

³⁹ Jacobson 35, “Many verses in the Bible are divided into two independent clauses-parallel “halves.” The second half is marked with the *ta'am siluk*. The first “half” is marked with the *ta'am etnahta* (◌txnt)). This Aramaic word, related to the Hebrew hxwnm, means a “resting point.” The etnahta was originally written in the shape of an upside-down “v.” The modern symbol, used in most printed Bibles, resembles a vertical line resting on top of a convex semicircle. The *etnahta* is placed under the first letter of the stressed syllable.”

⁴⁰ “Like the Hebrew *migra*’ the primary name ‘Koran’ derives from the root q-r, i.e., ‘reading’: the visual implication of text is not implied with this root. Rather the concepts ‘pronounce, calling, reciting’ are expressed with the word, so that an adequate translation of Koran (Qur’ān) could be ‘the recited’” (Zimmerman, 27, translation by Biró).

⁴¹ “*Tajwīd* [is] the system of rules regulating the correct oral rendition of the Qur’an. The importance of *Tajwīd* to any study of the Qur’an cannot be overestimated: *Tajwīd*, preserves the nature of a revelation whose meaning is expressed as much as by its sound as by its content and expression, and guards it from distortion by a comprehensive set of regulations which

not as “song” but “recitation” are, like those of Jewish Torah trope, determined by both the religious and larger musical cultural contexts. A main part of the practice of *Tajwīd* is the practice of *gunnah* or nasality and *madd*. The rules of *Tajwīd* “regulate what phonemes and syllables are to be articulated through the nasal cavity.”⁴³ Michael Sells has observed the employment of *gunnah* and *madd* in the following passage from the *sura al-qadr*:

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ	Sura of Destiny Al Qadr
إِنَّا أَنْزَلْنَاهُ فِي لَيْلَةِ	1) <i>Innā anzalnā hu fi laylati l-qadr</i> Indeed we sent down him/it on the night of qadr
الْقَدْرِ ۝ وَمَا أَدْرَاكَ مَا لَيْلَةُ الْقَدْرِ ۝ لَيْلَةُ الْقَدْرِ	2) <i>Wa mā adrāka mā laylatu l-qadr</i> And what can tell you what is the night of qadr
نَدِيرٌ ۝ مِنْ أَلْفِ شَهْرٍ ۝ تَنْزِيلُ الْمَلَكِ وَالرُّوحُ فِيهَا	3) <i>Laylatu l-qadri khayrun min alfi shahr</i> The night of destiny is better than a thousand months
يَأْذِنُ رَبِّهِمْ مِنْ كُلِّ أَمْرِ ۝ سَلَامٌ هِيَ حَتَّىٰ مَطْلَعِ	4) <i>Tanazzalu l-malā'ikatu wa r-rū hu fihā</i> Come down the angels and the spirit in her/it
الْفَجْرِ ۝	5) <i>Bi idhni rabbihim min kulli amr</i> by permission of the lord from every order <i>Salamun hiya hattā maṭla' 'i l-fajr</i> peace she until the break of dawn

Example 3

The author explains: “An example of the un-translatibility of Qur’anic sound and idiom occurs in the first phrase of the Sura: *Innā anzalnā*. The unit *innā* in Arabic is a combination of two words: *inn*, a particle of intensity sometimes translated (lamely) as „indeed“ or „lo,“ and *nā*, which is the pronoun for „us.“ The two words are combined in a way that forms a strong *ghunna* (nasalization) in Qur’anic recitation, and the *madd* or elongation of the *ā* at the end of the *innā* increases the intensity. Then that key combination of *n* and *a* is picked up and used in the next word in various combinations *anzalnā*.⁴⁴

The syntactical functionality of musical formulae, as demonstrated in the example of Jewish *te’amim*, as well as the abovementioned *untranslatable* aspect of phonetics in Qur’an recitation become emulated within the composition via the structuring of musical material in an electroacoustic framework.

Musical Material as Phonetic Analogy

govern many of the parameters of the sound production, such as duration of syllable, vocal timbre and pronunciation.” Kristina Nelson, *The Art of Reciting the Qur’an* (Austin: University of Texas Press, 1985), 21.

⁴² “*Tarīl*, another term for recitation, especially implies slow deliberate attention to meaning, for contemplation.” Neubauber and Doubleday, *Grove Music Online*. Accessed December 15, 2012. <<http://www.grovemusic.com.ezproxy.library.uvic.ca>>

⁴³ Nelson, 21.

⁴⁴ Michael Sells *Approaching the Qur’an* (Ashland: White Cloud Press, 1999), 188.

In the first movement *Hadavar (The Word)* phonetic material is structurally associated with processing and electronic diffusion. The amplified voice, spatialized via MAX/MSP, presents five basic types of musical material that relate back to the corresponding gematria values:⁴⁵

הדבר (The Word) Canon Structuring in Voice Part

וישמעו ("vayishmeu") = 432 **וישלחו ("vayeshaléhu") = 360**

The image shows a musical score for the voice part of 'The Word'. It includes staves for Voice, Elec (Electronic), Piano, Gong, and MSP (Max/MSP). The score is annotated with gematria values and vocal techniques. The first section is 'וישמעו ("vayishmeu") = 432' and the second is 'וישלחו ("vayeshaléhu") = 360'. The score includes various musical notations such as dynamics (p, mf, f, pp, fff), articulation (accents, slurs), and performance instructions like 'inhale'. The MSP part is labeled 'Program 4 - A'.

<u>Gematria Values</u>	<u>Vocal Techniques</u>	<u>Electronic Diffusion and Processing</u>
1-9	Tenuto	Loudspeaker 3
2-8	Inhaled	Loudspeaker 4
3-7	Throat tremolo	Loudspeaker 2
4-6	Repeated notes	Loudspeaker 1
5	Sustained tone	Loudspeaker 5,6 (Convolution with Gongs)

Example 4

This structuring serves as a metaphor to the phonetic production in Qur'an recitation. While the actual pronunciation of the Qur'an is to be consciously produced using specific realms of the mouth, tongue and throat,⁴⁶ in *Hadavar (The Word)* such phonetic production happens in an electro-acoustic spatialized setting: the spatialized loudspeakers within the concert hall thereby exist as an analogy to the various places of pronunciation within the mouth of the *Qori*.⁴⁷ Simultaneously, the instrumental combination of contralto with piano accompaniment brings forward references to the German *Lied*. Such analogies to chant traditions, as well as to traditions of post-enlightenment Western art music continue to surface in the following movements.

The third movement *Lakhen (Therefore)* is scored for contralto, two spoken voices, ensemble, and electronics. While the two spoken voices enunciate the *Haftarah* text in German translation, the movement takes the form of a hidden piano concerto in which the piano eventually disappears. Gematria is employed to produce the rhythm and duration of the phonetic sound and this phonetic

⁴⁵ Done in coordination with Reinhold Braig at the Experimental Studio and Kirk McNally at the University of Victoria.

⁴⁶ Nelson describes the production of phonemes: "Points of Articulation (maxārij al-hurūf). These are classified according to the position of the vocal tract, starting with the larynx (*aqsa l-balq*), and proceeding forward to the lips (*sifatan*)." Nelson, 18.

⁴⁷ Arabic for "recitor."

sound, in turn, becomes “translated” into instrumental timbre. While instrumental timbre serves to imitate the phonetic structure of the text, the sounding instrument simultaneously brings its own historical and contextual associations to this phonetic “translation.” In mm. 1–8 the strings and winds imitate the phonetic material and rhythmic structures of the voices, forming a unified speaking–ensemble–entity. This is juxtaposed by the piano arpeggios that move in a rhythmically independent manner. The pitches for each timbral family (flute, clarinet, and strings) are formed from multiplied scales, which originally derive from a *Haftarah* trope scale.

The image displays six musical staves, each representing a different scale. Above the first staff, the text 'central pitch of scales' is written vertically. The scales are as follows:

- Haftarah Scale:** A single staff with notes numbered 1 through 9. A double bar line is placed after note 4.
- Contralto Scale - Basic value = Quarter Tone (scale numbers correspond to gematria values):** A staff with notes numbered 1 through 9.
- Flute Scale - Basic value = Half Tone (scale numbers correspond to gematria values):** A staff with notes numbered 1 through 9.
- Clarinet Scale - Basic value = 3 Quarter Tone (scale numbers correspond to gematria values):** A staff with notes numbered 1 through 9.
- Scale for Strings (Violin, Cello, Contrabass) - Basic value = Whole Tone (scale numbers correspond to gematria values):** A staff with notes numbered 1 through 9.
- Piano Scale - Basic value = 5 Quarter Tone (scale numbers correspond to gematria values):** A staff with notes numbered 1 through 9.

Example 5

The pitches of the piano arpeggios are presented in intervallic mirror symmetry to those of the ensemble. While the rhythmic structure of the ensemble is structured via gematria, the rhythmic structuring of the piano arpeggios is determined solely by the number of pitches per measure and the subdivision thereof.

**Piano intervals form mirror symmetry with those of the ensemble
Pitch and Rhythm structure of piano:**

**Ensemble
Pitch and Rhythm structure of Ensemble**

$\aleph\aleph$ ("spricht") = 241 $\aleph\aleph$ ("der Herr") = 26
 Rhythmic and scale structuring derived from Gematria values

3:2[♭] 3:2[♭] 3:2[♭] 6:4[♭] 3:2[♭]

Central pitch G forms basis for intervallic mirror symmetry

fl. cl. vl. fl. pno. fl. clar.
 s - p - r - i - c - h - t d - e - r H - e - r - r

Example 6

In the course of the composition, a latent “piano concerto” develops from the text-based musical framework. At the end of syntactically determined phrase units, the piano enters the perceptual foreground with a series of repeating cadences. In mm. 45–48 the piano is heard in conjunction with the held tones of the contralto, which serves to momentarily reintroduce associations to *Haftarah* and *Lied* heard in the first movement. As the phrase units of the section, based on syntactical units of the Hebrew text, repeat, the ongoing electronic processing, following the gematria-derived rhythmic structuring of the text, functions to suspended the listeners sense of time and musical syntax before the next phrase is heard.⁴⁸ The following example shows how such musical material, derived from gematria structuring of the Hebrew text, is dissolved within such a framework. Here the microtonal inflections in the piano become a point of concentration (the 31 cents between *C ordinario* and *C* seventh harmonic juxtaposed), as the electroacoustic processing helps to create a spatialized sound texture independent from text.

⁴⁸ This processing, which routes the sound through various forms of gates, filters ring modulation in a spatialized, gematria-controlled setting, serves to create a sense of “stained-glass speakers” within the concert hall setting.

Example 7

In the course of the movement, certain instruments are transformed to resemble individualized speaking entities, almost becoming instrumental “characters.” In the fifth section of *Lakhen (Therefore)* flute, clarinet, and violin move away from the enunciation of phonetic material and take over the symmetrically inverted pitches of the piano while the cello increasingly integrates phonetic elements of the text previously spoken by the voices. The movement, which exists as a latent “piano concerto,” transforms into an increasingly emancipating “speaking cello concerto.” Within this section, the dissolution of musical material – the obliteration of the latent piano concerto, and the disappearance of speaking voices – helps to create a musical analogy to the *Haftarah* text of the section: “I hereby give the command — declares the Lord — by which I will bring them back against this city. They shall attack it and capture it, and burn it down. I will make the towns of Judah a desolation, without inhabitant.” In this last section of the movement, the dialectic of instrumental “labor” becomes apparent in terms of instrumentation; while some instruments of the “speaking” ensemble become slowly “outsourced,” the parameter of “labor” becomes intensified in the cello part. Here a conceptual transformation occurs, as the German translation of the increasingly fragmented *Haftarah* text becomes replaced by the “abstracted” phonemes of the cello, thereby displaying complex relationships between spoken word and musical material, between “speaking” subject and “playing” object, as well as between textual comprehension and musical abstraction.

**Cello phonetics based on the German words “abgezogen sind”
derived from word אבגזגן (HaOlim) = 715
5 letters = 5/4 measure**

Example 8

While musical analogy is created through musical–structural associations to the text, the musical material of the composition also exhibits *topical associations* to further explicate textual meaning.

Musical Material as Structural Analogy

In *Ko Amar (Thus Said)* gematria is employed to create musical material via parametrical structuring, musical topics⁴⁹ are either read out of or embedded into the resulting musical material. This tension between gematria structuring and topical interpretation is paralleled by the employment of musical material. While much of the musical material derives from or is influenced by practices of religious chant, associations to “absolute” music reveal themselves throughout the work.

In the third movement, *Lakhen (Therefore)*, topical transformations of musical material serves to create musical analogies to the Haftarah text. For instance in m. 38 fragmented phonemes of the German word „Hunger“ (English: „hunger“) is iterated by the two speaking voices in an *quasi-Sprechstimme* manner. Associations to hunger (the disappearance of food) become presented via musical analogy, as a sequence of musical material („phoneticized“ pitches of the strings and winds that imitate the previously spoken text of the voices and arpeggios played by piano and double bass) becomes dissolved over eight bars only to enter into a sonorous landscape of sparse musical texture.

The image displays a musical score for Example 9, spanning measures 38 to 45. The score is arranged in six systems, each with a different instrument or voice part. The instruments are Bass Flute, Clarinet in A, Voice 1, Voice 2, Violin, and Violoncello. The score includes various musical notations such as notes, rests, and dynamic markings (pp, mf, mp, p, f, ff). Performance instructions are provided for several instruments, including 'air' for the flutes, 'Bartók pizz.' for the violin, and 'Flaut. tasto' for the cello. The text 'Lunga' is written above the final measure of each instrument part. The score is set in 2/4 time and features a key signature of one sharp (F#).

Example 9

Theological meaning is presented in a variety of ways throughout the movement. For the following text, topics help to underline the meaning of the following text:

⁴⁹ For more on topics and topic theory see Kofi Agawu, *Playing With Signs* (Princeton, N.J.: Princeton University Press, 1991).

34-18 “I will make the men who violated my covenant, who did not fulfill the terms of the covenant which they made before me, the calf which they cut in two so as to pass between the halves.”⁵⁰

34-18 “Und will die Leute, die meinen Bund übertreten und die Worte des Bundes, den sie vor mir gemacht haben, nicht halten, so machen wie das Kalb, das sie in zwei Stücke geteilt haben und sind zwischen den Teilen hingegangen.”⁵¹

The text describes what will happen to those who commit idolatry, making an association between the ones who violate the covenant and the calf itself (this has been eloquently explained by Rashi).⁵² The comparison between the two halves of the calves and the covenant is presented via a musical–structural analogy in the third movement. In measure mm. 113-114 the pitches of the piano, complimenting those of the ensemble in perfect intervallic mirror-symmetry inversion, represent the two parts of the “calf.” Simultaneously, the contralto, singing in Hebrew **העגל** “ha’egel” (“the calf”), presents the central pitch around which the intervallic inversions of the piano chords revolve, and this central pitch acts as the basis for the subsequent ring-modulated tones of the ensemble.

⁵⁰ Lieber, et al. eds., 483.

⁵¹ “Die Bibel.de.” Accessed January 29, 2012, <http://www.die-bibel.de/online-bibeln/luther-bibel-1984/bibeltext/bibel/text/lesen/stelle/24/340001/349999/ch/01de3bb8803917d5b8a99b93d79b8ee2/>

⁵² Chabad.org. “Texts and Writing.” Accessed January 22, 2012. http://www.chabad.org/library/bible_cdo/aid/16031/showrashi/true, accessed January 7, 2012. “When they cut the calf in two: Why they returned and forced them to be slaves, they all made a covenant to rebel against the Omnipresent and cut a calf in two and passed between its parts to rebel against Him, and that was a strong covenant and a final one, saying, So shall the one who transgresses be cut and divided.”

The image shows a musical score for Example 10, starting at measure 112. The score is written for seven instruments: Flute (voice), Alto Flute, Clarinet in A, Contralto, Piano, Violin, and Violoncello. The time signature is 16/4. The Flute (voice) part has a melodic line with a 'b' below it. The Alto Flute and Clarinet in A parts have dynamic markings of *f*, *pp*, *ff*, *ppp*, and *fff*. The Contralto part has the lyrics 'ha', 'c', and 'gel' under the notes. The Piano part has *ppp* markings. The Violin and Violoncello parts have dynamic markings of *ff*, *ppp*, and *fff*, and performance instructions like 'arco tasto', 'nat.', and 'pont.'. The Contrabass part has a *f* marking and 'Bartók pizz.' above it. There are also some rhythmic markings like '5:4' and '3:4' above the staves.

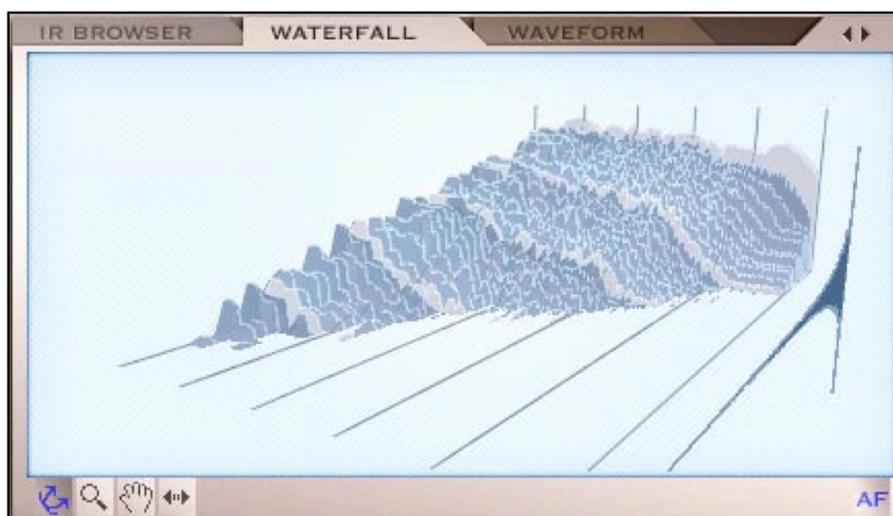
Example 10

This process of dissolution becomes heightened in the following movement: here contralto and cello act as a unified, speaking entity within an electroacoustic environment. The phonetic material of the text is first presented in a fragmented manner by contralto and “speaking cello” and this becomes disintegrated in the course of the movement, as resonance becomes a foreground parameter, allowing the listener to discover a realm of “negative space” within the electroacoustic spatialized setting of the concert hall.

Negative Space

In *Ko Amar (Thus Said)* the concept of “negative space” is investigated via instrumental resonance. In architecture, negative space relates to the hollowing out of a solid object that already exists. In the composition resonance is used to present traces of sounds that “were there before” by means of “ghost instruments,” resonating acoustic instruments that become activated by computer

processing. Investigating concepts of absence and memory, convolution is employed (a procedure in which the timbral information of one instrument gets processed by that of another instrument, acoustic space or sound) in coordination with resonant instruments, which create sonorous “shadows” of corresponding instruments played by performers. The time-frequency representation of an impulse response can be observed in a waterfall chart (Example 11).⁵³



Example 11

In movement four *Hineni (Therefore)* all musical material derives from words of a single Hebrew sentence:

„Therefore I give the command — declares the Lord — by which I will bring them back against this city. They shall attack it and capture it, and burn it down. I will make the towns of Judah a desolation, without inhabitant.“⁵⁴

In the course of the movement musical material is put through a process of entropy; such a development exists as a textual analogy, moving to a sonorous realm "without inhabitant". The stripping down of material to a point of concentration – the central resonating of gongs not struck but rather animated via the combination of live contralto, cello, contact microphones, and convolution processing in MAX/MSP – allows for the „trace“ of musical material to be heard as the result of this entropic „unmasking.“ At the end of the movement, the bones of the text – the consonants - have been eradicated and all that remains – after the repeated inhaling of the contralto – is the ensuing, pulsating resonance of the gongs.

⁵³ See “Surround Sound Impulse Response” <http://arqen.com/acoustics/surround-sound-impulse-response/> accessed on April 7, 2013 at 5:55 PM. See also Farina, A., “Advancements in impulse response measurements by sine sweeps,” *Presented at the 122ed AES Convention, Vienna, Austria, May 2007*.

⁵⁴ Lieber, et al. eds., 482.

Example 12

For the listener such a discovery of musical material is to hear through the various layers of sound as they are stripped away. The phonemes, put through a process of dissolution, exist as a fragment of liturgical music from previous times. While the ruin exists as a remnant of memory, it also serves to activate the listener’s memory and questioning of the historical nature and validity of sound with resonance existing as the final stage in a gradual process of material disintegration.

Remembering the Song – Reconstructing the Word

The text of the fifth movement deals with the restoration of the covenant: “Thus said the Lord: As surely as I have established my covenant with day and night — the laws of heaven and earth.”⁵⁵

Here melody is restored, as the *Haftarah* text is heard with accompanying *te’amim*. This melodic material, sung by the contralto, acts as the basis for the ensuing syntactical phrases, which consist of ring-modulated overtone “shadows” of the melody.

Example 13

Here the overarching metrical structure is homogenized, adhering mainly to a 4/4 metrical framework. While the sung *Haftarah* phrases are presented within this framework, the rhythmic subdivisions of the overtone “shadows,” presented by the ensemble are determined by gematria values derived from the words of the text. Simultaneously, the phonetic structure of the *Haftarah* text becomes imitated via instrumental timbre.

⁵⁵ Lieber, et al. eds., 483.

In this movement the liturgical functionality of the text is reestablished, as melody serves to connect and divide syntactical phrases. Simultaneously, the restoration of the *Haftarah* melody, sung by contralto, also allows the listener to remember final melodic phrases of the first movement *Hadavar* (*The Word*) and the revelation of the intact *Haftarah* melody as evolved from melodic and syllabic fragments of the *Haftarah* portion.

In Hebrew the word דָּבָר *davar* (word) incorporates the same consonants as the word דִּבֶּר *diber* (to speak). In *Ko Amar* (*Thus Said*) musical material has a direct relation not only to the spoken and sung word but also to the history thereof, as the sonorous object has a direct correlation to the vocal and instrumental enunciation of the text. Such enunciation relates back to traditions of chant and to a culture wherein music serves for the contemplation and reverence of the transcendental. The resulting sonorous symbols of this music traverse historical and cultural distances from the secular realm of a post-enlightenment musical modernity back across generations to the beginning letter of aleph as enunciated at Sinai, the pronunciation of which intuited through the listening to history.⁵⁶

Through its form expanding over three hours, the *Mishpatim* (*Laws*) cycle constitutes numerous layers of meaning. In this way, the work seeks to present a situation of musical pluralism as language, musical and linguistic, exists for listener decoding. In this way its process exists as creative ethnomusicology, as the practice of transcription becomes integrated into the compositional realm.⁵⁷ As elements of monotheistic chant are structurally integrated into the composition, they transform to become part of a diversity of sonorous species within a larger musical language or coded, phonetic/musical system.⁵⁸

⁵⁶ Gerschom Scholem, „Religious Authority and Mysticism“ in *On the Kabbalah and its Symbolism*, p. 38: „This conception of Moses as interpreter of the divine voice from the people was developed much more radically by Maimonides, whose ideas R. Mendel of Rymanov carried to their ultimate conclusion. In R. Mendel's view not even the first two Commandments were revealed directly to the whole people. All that Israel heard was the aleph with which in the Hebrew text the first commandment begins, the aleph of the word 'I'. This strikes me as a highly remarkable statement, providing much food for thought. For in Hebrew the consonant aleph represents nothing more than the position taken by the larynx when a word begins with a vowel. Thus the aleph may be said to denote the source of all articulate sound... To hear the aleph is to hear next to nothing, it is the preparation for all audible language, but in itself conveys no determinate, specific meaning. Thus, with his daring statement that the actual revelation to Israel consisted only of the aleph, R. Mendel transformed the revelation on Mt Sinai into a mystical revelation, pregnant with meaning, but without specific meaning. In order to become a foundation of religious authority, it had to be translated into human language, and this is what Moses did. In this light every statement on which authority is grounded would become a human interpretation, however valid and exalted, of something that transcends it. ... [T]he truly divine element in this revelation, the immense aleph, was not in itself sufficient to express the divine message, and in itself it was more than the community could bear. Only the prophet was empowered to communicate the meaning of this inarticulate voice to the community.“

⁵⁷ See for more on the relation between composition and ethnomusicology see *Béla Bartók's String Quartets: Tradition and Legacy in Analytical Perspective*, co-edited by Dániel Péter Bró and Harald Krebs. Oxford University Press, 2013 (forthcoming).

⁵⁸ See Helmut Lachenmann, „Art and Democracy“ in *The Second Century of New Music: Search Yearbook Volume 1*, Franklin Cox, Dániel Péter Biró, Alexander Sigman and Steven Kazuo Takasugi eds. Mellen Press, 2012, 245-246. „Just as the attempt to create a degree of environmental awareness in society seems to have had a certain success—with setbacks, of course—it should be possible, and it is certainly worth trying, it should be possible to convey the notion of the "mature citizen." And this not merely as a catchword, but rather in a manner that opens up a reflective understanding of democracy, one that would stand in deliberate opposition to what I earlier, somewhat simplistically, called "stupefaction," and one that involves—and precisely here the contribution from our perspective as artists is crucial—an imaginatively and intellectually electrifying awareness of what makes the concept of art so indispensable for all of us. And every day, with all the forms that are already in place in our society for conveying such an ideal, is either a seized or wasted opportunity.“