CONSTRUCTING AN ARCHITECTURAL MODEL OF MUSIC: A COMPARATIVE STUDY OF BEETHOVEN'S NINTH SYMPHONY AND VAN ALEN'S CHRYSLER BUILDING

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ABSTRACT

This dissertation introduces a methodic approach for constructing an architectural model of music, particularly when derived from connections between Beethoven's renowned Ninth Symphony and New York's celebrated Chrysler Building. Starting with a historical critique of non-systematic, or cursory surveys between the subjects of music and architecture, the author proceeds into a unique theory of art, which proposes that creative vehicles are inhabited by a kind of inspired genius. The study subsequently introduces sculpture as a "mediator" between our two main art-forms under discussion, and one that serves as an aid when embodying their associated concepts. The author then employs systematic terminology, or "spectrums" in parallel between these formal expressions, while simultaneously assembling a complex array for the mechanics of tonality in music. When applying this manner of analysis to William Van Alen's Art Deco masterpiece and the famous romantic Symphony, a visual profile is lent to the catalog of music theory, alongside a harmonic interpretation of architecture, before concluding with how these artistic subjects are significantly distinguished from one another.

ACKNOWLEDGMENTS

The completion of this dissertation represents a very special endeavor, having taken a leave of absence during an earlier phase of my doctoral matriculation, but also because of the graciousness and inspiration extended to me by numerous remarkable people.

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A second, but vital aspect of my research was assisted by the accomplished staff at RFR Realty at the Chrysler Building, the Department of Buildings in New York City, and those at the Library of Congress and Smithsonian Institute, both in Washington, D.C. I had the similar privilege of becoming acquainted with David Stravitz, who granted use concerning his published discovery of original Chrysler Building photographs, and a number of architecture firms, including Eric Fisher at ARCHitecture, who became correspondent with some of my technical inquiries. In addition to construction and manufacturing companies, several representatives at publication houses expeditiously assisted with licensing requests for the voluminous amount of illustrations in my

dissertation. For those consultants I haven't specified, I am appreciative that the Bibliography in this writing is able to give credit regarding their invaluable contribution.

Finally, but certainly not least, I would like to extend a special thanks to

Scheherazade Darvish for her personal encouragement; to my family, who has held a

great deal of patience over several years; and to my friends, who have done so as well,

while expressing their readiness to celebrate academic success.



The author with Mr. Juan Palacio of RFR Realty and Security Director for the Chrysler Building. Chrysler Building lobby, December 2021.

Deo Gratias, Dator Vitae et Omnium Magni Mysterii Creatori

Thanks Be to God, Giver of Life and Creator of All Great Mysteries

PREFACE

During studies for my Masters degree in the City University of New York at Queens College in the Aaron Copland School of Music, I can recall where my Composition Professor, Dr. Henry Weinberg explained how mathematical ratios could be used correspondingly between pitch intervals and durational tempi. Weinberg historically belonged to a generation whose luminaries included modernists such as Milton Babbitt and Karlheinz Stockhausen, with whom he had academic and personal acquaintances. When keenly perusing Weinberg's own doctoral dissertation, "A Method of Transferring the Pitch Organization of a Twelve-tone Set through All Layers of a Composition; A Method of Transforming Rhythmic Content through Operations Analogous to those of the Pitch Domain" at Princeton University, I was struck by the extent and depth to which he composed with rhythmic proportions in his String Quartet No. 2 (1964), arguably preceding some of the "New Complexity" artists such as Brian Ferneyhough and Michael Finnissy. Little did I realize that this discovery concerning ratios would have prompted me into hypothesizing duration and pitch as coordinate axes and then to calibrate volume as a third dimension, but effectively it created the grounds for a virtual musical space. Returning to mathematics, Pythagoras from the ancient world is accredited with grasping that ratios can be applied to scientific phenomena, including his attributed concept of musica universalis, or "harmony of the spheres." The idea of proportions was also applied to frequencies across the human range of hearing by Stockhausen in Gruppen

¹ This remarkable conception of cosmic functions bears a striking resemblance to how tonality behaves in music, and subsequently can be seen as a primal inspiration behind the complex array model, proposed in this dissertation's ensuing chapters.

(1957), for example, but a greater inspiration emerged for myself and that was the notion of visualizing music.

The conception of "seeing" music has a diverse history, from the earliest efforts of notation to its most recent technological representations, with research continuously expanding into phenomenological sensation. Nullsoft's development of Winamp and its Advanced Visualization Studio (AVS) media player (version 1 released in 1997) provides a striking example, where users can select digital presets and transform a rendered image that responds to sonic impulses. Philosophically one could argue that opera and even spectacular Rock concerts are corporal manifestations of the musical art, while interest toward multi-disciplinary curricula has enjoyed a widening popularity within the academy. While much progress has been made towards realizing the imagery of music, my own introduction to architecture as a theoretical means arrived in two stages: returning to the three-dimensional concept that I had extrapolated during my studies at Queens College, I had expanded it into a kind of model and then employed a set of Tinkertoys as an aid, myself at most, being a novice regarding mechanical engineering. I continued composing and contemplated its system being related to musical tonality, but did little more to bring it into some kind of physical manifestation. Some years later though, when teaching an introductory arts course at Penn State University, Abington College, I saw how the engineered structure of a building might provide insight into the technical workings of a musical piece, particularly when studying and discussing Vlado Milunić and Frank Gehry's "Dancing House" (or Tančici dům, Prague, 1996). Even though Gehry had nicknamed the Nationale-Nederlanden building, "Fred and Ginger" through its resemblance to Hollywood's dancing pair of Fred Astaire and Ginger Rogers,

this exploration of parallels across the arts became one of the prime objectives of the course, and hopefully is one of its rewarding features.

As for why I've chosen Beethoven's Ninth Symphony and Van Alen's Chrysler Building to inspect and though, perhaps seeming simplistic, pragmatically, both Opus 125 and the Art Deco skyscraper have substantial documentation, be it statistical, photographic or testimonial, as opposed to other intriguing, yet obscure musical and architectural treasures. This was augmented by the fact that from my residence in Philadelphia, New York is a reasonable drive, where my visits with Chrysler staff and the City's governmental records became pleasurably fruitful. Second amid these plentiful resources, I believe that the symphony and the Manhattan construction are both culturally iconic, when representing not only their artistic genres within their respective historical eras, but also having an affinity when generating interest and appeal for academic and popular readers. As indication lately in 2015, the Los Angeles Philharmonic launched a concert production that is treated with virtual-reality graphics, and Beethoven's orchestral music became the subject of this adventuresome programming.² Lastly said without reservation and having lived in New York, my own experience, when walking the streets and admiring the skyline from surrounding boroughs, was personally memorable, and I similarly hope to communicate my enchantment to readers.

In principle, musical and architectural theory affords a bridge between abstract realms and the physical world, and yet perhaps, the human intellect will always be compelled by the mysterious and unknown. Still when exploring a complex subject,

² As part of the *Immortal Beethoven* Festival and led by conductor Gustavo Dudamel, where combined efforts of the LA Phil and the Simón Bolívar Symphony Orchestra perform the Ninth Symphony, a mobile truck, dubbed "VAN Beethoven," toured greater Los Angeles while harnessing the use of Oculus headset

where difficulties and obstacles often arise, one can hope that the intensive effort made during such an undertaking, is outweighed by the enjoyable satisfaction of uncovered inspiration.

"Music gives a soul to the universe, wings to the mind, flight to the imagination, and life to everything."

- Plato

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CHAPTER 1: HISTORICAL SURVEY

1.1 Scholarly Issue

During an era when the Roman republic transitioned into a military empire, the architect and civil engineer, Marcus Vitruvius Pollio wrote his foundational treatise, 1 *De Architectura* (c. 30–15 B.C.). In its ten published books, the author espouses the virtues of an architect who is educated and well-versed in a wide number of disciplines, including music, philosophy and geometry. Drawing upon physics also, Vitruvius advises that ballistae and other weaponry should be properly "tuned" when their twine is stretched by levers and struck, and each cord gives off a sounding tone (Morgan transl. 1914, 8; Figure 1.1). Here in a tome, which is not only recognized as the earliest surviving text on the subject of architecture, but Vitruvius also makes the first documented comparison to music, albeit more specifically between pitched notes and engineered armament. He resumes his study by discussing the construction of musical instruments and notably, the placement of acoustic resonators within a theater, 3 however let us move forward to historical instances where the analogy between music and architecture has been more precisely deliberated.

1

¹ Conventional history recognizes the earliest architect as Imhotep (Wells, paragraph 1), an Egyptian official (flourishing 27th Century B.C.E.) who built a pioneering step pyramid at the necropolis of Ṣaqqārah in the city of Memphis. Mark (prg. 15) claims that Imhotep wrote an encyclopedia concerning architecture and that later writers referred to this tome, however, its recorded sources are lost to posterity. ² Other translators, such as Rowland (page 21) use less figurative language and interchange "calibrate" with the outfitting of various war machines. Rowland later uses "tune" for the tension of strings in a catapult when launching straight projectiles, while Morgan uses "stretched" (p. 9).

³ This can be seen as a significant step towards constructing a musical model of architecture, and as counterpart to our dedicated thesis of constructing an architectural model of music. No physical evidence survives to corroborate Vitruvius's identified sites, though Sear (146) and Saliou (397-399) assert that articles have been discovered from the ancient theater of Gioisia Ionica and that they functionally correspond to how these *echea*, or "sounding vessels" (Pollio, transl. Morgan, 143) were used.



Figure 1.1: Roman ballista

Despite a growing body of achievements⁴ across the occidental and oriental world,⁵ it is not until the fifteenth century, where Leon Battista Alberti issues the next major publication on the subject of architecture, and a noteworthy quote therein, "We shall therefore borrow all our Rules for the Finishing our Proportions, from the Musicians, who are the greatest Masters of this Sort of Numbers, and from those Things wherein Nature shows herself most excellent and compleat" (Chapter V of Book IX). Alberti, an accomplished architect who formulated innovations in cryptography and

⁴ For purposes of this treatise, our study will focus on the more formal, rather than informal works of music and architecture. It should go without saying that either artform is of value, while focusing on higher concepts is more in line with this dissertation's theoretical formulations, which will be further explained in

⁵ Regarding academic purposes also, our study will focus on musical and architectural developments within a Western tradition. Though inviting a wider debate on distinctions between international cultures (again of

perspective in painting as well, could thus be described as a true Renaissance man; much like Vitruvius, yet from a different age. Thus following his influential, *De Re Aedificatoria* (1452, *On the Art of Building*), Alberti applies mathematical ratios that correlate music to the dimensions of a building, yet the ratios are not entirely congruent with the standard intervals of the tempered musical scale.⁶ Conversely, Guillaume Du Fay, a Franco-Flemish composer and leading figure of the Burgundian School,⁷ was commissioned to compose a motet for the consecration of the Cathedral of Santa Maria del Fiore in Florence in 1436. His *Nuper Rosarum Flores* reportedly utilized the proportions of the church's dome that was designed by Filippo Brunelleschi (Fig. 1.2), himself an innovative engineer and construction supervisor also, though several critics have contended the claim of how the two tenor's isorhythms have matched the dome's dimensions.⁸ Still as Alberti and his contemporaries were inspired to apply their equations between music and architecture,⁹ such an achievement could be considered somewhat incidental, since mathematics is a contextual language and a means that can be

universal value), the author accepts the premise that the heritage of Western aesthetics has influenced the works of Beethoven and Van Alen, and hence our analysis of Symphony No. 9 and the Chrysler Building. ⁶ In fairness to Alberti's insights, equal temperament had not developed in Europe for another century, while meantone and well-temperament were contemporary standards. Credit must also be given to Vitruvius for corresponding architectural dimensions to musical intervals, although his measurements were based on scalar steps (e.g., fourth, fifth and octave), rather than the logarithmic nature of frequency ratios across the pitch continuum.

⁷ For the less familiar reader, mensuration, as practiced in Dufay's day, is a complex form of music notation that outlines rhythmic proportions between the notes. Modern staff notation and time signatures eventually eclipsed its collection of context dependent symbols, but if seeking to appreciate rigorous mathematics in music, mensural notation promises a rich and detailed study.

⁸ As claimed by Charles Warren (92), the same cantus firmus is placed a 5th apart between two tenors and among different mensuration schemes. Craig Wright (405) suggests instead that the motet's arrangement was intended to reflect King Solomon's Temple as described in scripture, while Marvin Trachtenburg (743) claims that both Warren and Wright's arguments are both partially correct, and Tiago Simas Friere (Section 3) argues that neither is applicable.

⁹ Beyond those Renaissance architects who were interested in ratios, such as Andrea Palladio and Daniele Barbaro, selected paintings of Raphael ("A New Analysis of the Perspective Layout of Raphael's *School of Athens*," Couprie, p. 15) and Leonardo da Vinci's illustrations for *De Divina Proportione* (Rubino, prg. 3) have been speculatively associated with the "Golden Ratio." Johannes Kepler's calculations with Pythagorean theorem were deeply rooted in the golden mean as well (Meisner, p. 27).

utilized for virtually any subject. While the exact magnitudes of modern tuning historically developed as the philosophy and practice of architecture have continued to evolve, let us advance to the next item of significance, before cumulatively establishing a premise by which to resolve long-standing scholarly issues.



Figure 1.2: Duomo of Santa Maria del Fiore, Florence

Perhaps unsurprisingly, composers adapting music to architecture precede the concrete and weighty task of designing physical structures around performed sounds.¹⁰ The earliest recorded flourishing of the first scenario can be found in antiphonal music, where choirs are placed in opposing stalls of a church, and their polyphonic voices weave

a stereophonic "tapestry" within. This remarkable realization is primarily attributed to Adrian Willaert, who pioneered the technique in the 1540s at the Patriarchal Cathedral Basilica of Saint Mark in Venice, which itself is noted for its reverberance and delay (Fig. 1.3). In contrast and in response to complaints of excessive echo, a physics lecturer, Wallace Clement Sabine, became the first professional acoustic engineer, after adjusting room materials for a lecture hall at the Fogg Art Museum on Harvard University's campus. Sabine eventually devised a mathematical equation concerning volume, surface area and absorption coefficient, and this was purposefully applied to Boston's Symphony Hall in 1900. While Symphony Hall today is considered to be among the finest sounding performance spaces in the world, acoustics may not affect the theoretical, including tonal structure of music, if viewing surrounding architecture as a peripheral occurrence (Fig. 1.4). Nevertheless and finally, let us visit a celebrated quote and prepare our case concerning the quandary of systematizing relations between the aforementioned artistic subjects.

¹⁰ With some of architecture's earliest structures being interpreted as religious sites (e.g., Göbekli Tepe [Schmidt, 45] and the Megalithic Temples of Malta [Zammit, 1]), prehistoric constructions might have been accommodating to musical purposes, with this topic being of significant interest for continued research.



Figure 1.3: Patriarchal Cathedral Basilica of Saint Mark, Venice



Figure 1.4: Symphony Hall exterior, Boston

In 1803, Friedrich Wilhelm Joseph Schelling (Fig. 1.5) published "The Philosophy of Art," where he espoused that ideals manifest across empirical detail and ultimately, synthesize with reality. Art assumes the spirit of ideals and thus becomes one with highest philosophy, while the universe in turn, is the absolute artwork of God. With such groundwork laid, he states that "the anorganic art form, or the music within the plastic arts is architecture" and conversely where "architecture... is a form of the plastic arts and if it is music, then it is concrete music." These epigrams soon transmuted into the widespread aphorism, "architecture is 'frozen' music," as reputedly attributed to the literary figure, Johann Wolfgang von Goethe (1749-1832), and more precisely distilled by Arthur Schopenhauer (1788-1860) in his "On The Metaphysics of Music"; 12 the former was a university colleague to Schelling at Jena in Thuringia and as a writer and statesman, Goethe has been recognized for his contributions to German literature during the Classical Weimar period; the latter was a philosopher who rejected German idealism of which Schelling was a part, and Schopenhauer developed a rational view of the world as the product of determinable will. While philosophical achievements and popular phrases might capture the reader's imagination, reliance on whimsical metaphor can be criticized, if seeking to scientifically translate operations between the apparatuses of two different art forms.

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¹¹ Goethe's original text is written as *erstarren* in *Gespräche mit Goethe* by Johann Peter Eckermann (230), who was Goethe's personal secretary, and then translated as "petrified" by Oxenford (Vol. 2, 146). This distinction is of interest since "petrified" implies lifeless, while "frozen," as translated by Fuller (282), suggests dormancy and to that end, corroborates this dissertation's premise of art, as explained in Chapter

¹² Schopenhauer postulated "a piece of music, divested of rhythm, is analogous to the ruin divested of symmetry. Accordingly, in the daring language of that witticism, such a ruin may be called a frozen cadenza" in Chapter XXIX (Vol. 2, 454), a supplement to the third book of his *The World as Will and Representation*.



Figure 1.5: Friedrich Wilhelm Joseph Schelling

In sum from the preceding survey, it is apparent that studies have largely been cursory or methodically incomplete, when attempting to construct a model of music from the functions of architecture. If detecting another trend from the above-mentioned points, collaboration between our two central artforms has progressed from pragmatic exercise, through theoretical abstraction, and eventually into elevated philosophy, yet exact points

of correspondence have seldom been addressed.¹³ Contemporary writings have renewed interest amid popular magazines and online periodicals,¹⁴ but one frequently encounters a similar predicament. Nonetheless, I believe that understanding the connections between music and architecture is a viable endeavor and let us return to each artistic subject's roots, in order to compile a clearer picture.

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¹³ Among the more notable writers regarding this collaboration would be the composer and architect, Iannis Xenakis, although he predominantly examines mathematic applications in his *Formalized Music* (9), rather than correlating both physical and tonal structures.

¹⁴ Recently compelling articles include "What Is It about Music and Architecture?" (prg. 3) by Sean Joyner, which discusses perceiving time and space; "The Common Language of Music + Architecture?" (Janowiak, p. 67) discusses the human necessity of innovation within the arts; and Ali and Narjes Falakian's "Study on the Relationship between Architecture and Music" (94), which explores emotional effect between these two subjects. Most notably, Jencks (prg. 1) presents an informal survey between architecture and music with intriguing points of comparison, however I draw several different conclusions and will argue their discrepancies under Spectrum 2 accordingly.

2. ARTISTIC THEORY

In order to properly understand the relation between architecture and music, recognition of their academic categories should be established. It must be said that the categories themselves are premised on a theory of art, which I believe is unique. Given confined space in this study, though, the presented arguments will have to rest upon several assumptions, which the author intends to develop later in a separate writing.

2.1 Ingenious Art

Despite centuries of contemplation by able philosophers and numerous theories that are continuously subject to scrutiny, I submit the claim that art is not identified by beauty, emotion, imitation, or strictly by its academic environment as the aesthetic, expressive, mimetic, or institutional theories would historically argue, to name a few. Rather, it begins with the conception of a peculiar kind of life, or what antiquity has referred to as *genius*.

In the mythology of ancient Rome, a genius is considered to be a supernatural spirit that accompanies chosen individuals throughout their lives, while imparting guidance for important decisions. Much like a guardian angel when observing a religious host, genii were also said to inhabit certain locations (*genius loci*) and to offer those areas a distinctive character with added protection.¹ The modern conception of genius often denotes a superior intellect without a spiritual component (Oxford English Dictionary),² however I

¹ While similar etymologically, pre-Islamic Arabian Jinn could also reveal prophecy and impact personal health, although their roles have been attenuated according to Qur'anic code (McAuliffe, 43).

² Pointing to some distinction between theology and philosophy, other English words show a degree of secularization, including *theo*-ry (i.e., prefix, "god") and *psyche* ("soul, mind"), from earlier spiritual language (both examples, Online Etymology Dictionary).

suggest that this spirit epitomizes a deific abstraction (Figure 2.1) that is placed within a work of art. This follows a Baroque description, where Anthony Ashley Cooper, Third Earl of Shaftesbury writes, "this Figure... brings me to fancy of this *Genius*" in *The Moralists*, to represent the love of youthful beauty (1709, 61), and he proceeds to "Considering how your Genius stood inclined to Poetry" when in a discussion between characters, Philocles and Palemon (13). Interestingly, a Hellenistic variant of genii includes *daemons*, which is the Latin word for "god-like" or "provider" when referring to lower deities.³ While daemons appeared in the Hebrew Bible that was translated into the Greek Septuagint and later conceived as an evil spirit by Saint Augustine in Christian writings (*City of God*, Book IX) during the early fifth century A.D.,⁴ it is important not to discount that lesser spirits might possess a virtuous component in their supposed constitution.

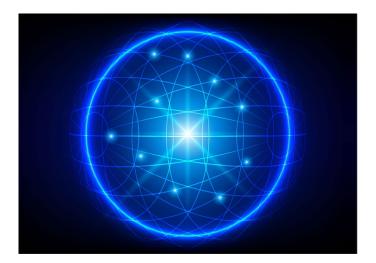


Figure 2.1: Abstracted spirit

³ Delahunty 2008, 90.

⁴ Fuller 2013, Chapter 4.

2.1.1 Conceptual Autochthony

Building upon the prior section, I proffer that art is bestowed a kind of genius within its physical embodiments, and this is an animated aspect of spirit. This "life" can be described as a subordinate degree of conscionability, without free will or sovereign autonomy, but derived from theosophy (a philosophical conception of God), administered by inspired humanity, and then dramatically placed as part of a functioning artwork for an indefinite period of time. This subsidiary grade is not meant to corrupt the spirit in a moral or unethical sense, but rather to honor its authorship as a sententious carrier for human creativity.

To give a name to this life which inhabits art, I suggest looking back to historical genius for another type of spirit, while adding a compelling dimension to its pedigree. Originating from ancient Greece, *chthonics* have been described as spirits of "the nether world," but with a more literal translation of "in the earth." Chthonoi became associated with ritualistic aspects of culture, such as offering sacrifices to the goddess of fertility (i.e., Demeter) or singing choruses to the presider of the sea (i.e., Poseidon), though their assignments were not always well-defined. Expanding the term through modern linguistics, autochthones ($\alpha \dot{v} \dot{v} \dot{c} \dot{c}$ autos "self" and $\chi \theta \dot{\omega} v$ chthon "soil," i.e., "sprung from the earth" describe the indigenous people of a country or land, but if borrowing from "autonomy" as a mode of conscionable independence and the creativity of an artist as "author," I would like to issue an adaptation, where autochthony is the life imparted to art (Fig. 2.2), just as

⁵ Liddell and Scott, A Greek-English Lexicon.

⁶ Ibid

⁷ Wiktionary, the Free Dictionary.

⁸ Liddell and Scott.

the material manipulated by artists is typically of an earthly or substantive nature (e.g., oil painting, a bodily dance, theatrical costumes, etc.).

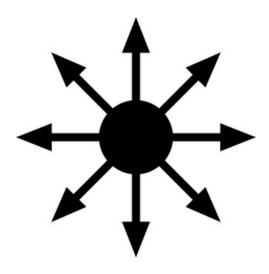


Figure 2.2: Animated inspiration

Having determined its most essential component, I propose that art is distinguished by metaphysical life as conscionably imparted to an aesthetic vehicle. Slightly expanding the canonic definition of aesthetics also from "a branch of philosophy that deals with the nature of beauty and the evaluation of taste, as well as the philosophy of art (its own area of philosophy that comes out of aesthetics)," I'll be using the term *aesthetic* to mean "creatively elevated" or "raised." This extends the function of artistic chthonoi into cosmogenic planes, by placing genius above human faculty, while bearing similarity to mythological echelon and angelic hierarchies. Cosmology has been interchangeable with cosmogeny, 10 though cosmogeny in its modern sense includes exploring astronomical

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⁹ Wikipedia, the Free Encyclopedia.

¹⁰ WordNet Dictionary.

bodies and scientifically understanding the universe. 11 Still as cosmology examines celestial orders while embracing strains of philosophy, mythology and religion, our study pinpoints the imagination¹² as the crucible of creative power, and hence where artistic genius would hypothetically reside (Fig. 2.3). Reflecting this evolution of autochthony, Henry James, a literary realist, espoused a similar view when proclaiming that "the province of art is... all experience; it is... a kind of huge spider-web of the finest silken threads suspended in the chamber of consciousness and catching every airborne particle in its tissue; it is the very atmosphere of the mind; and when the mind is imaginative—much more when it happens to be that of a man of genius—it takes to itself the faintest hints of life."13

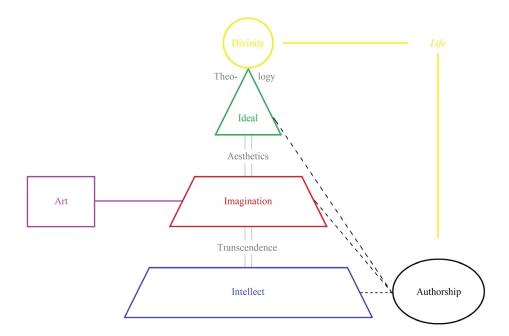


Figure 2.3: Metaphysical tiers

¹¹ Webster's Dictionary.

¹² Immanuel Kant proposed a similar argument regarding genius and where the imagination surpasses rationality, although he refrains from raising the faculty of the mind unto the divine (Critique of Judgment, §49).
¹³ "The Art of Fiction" (1884, Vol. 4).

2.1.1.1 Vehicular Inhabitance

By working with autochthony, the primary exercise of the imagination would be how that life coheres into an idea. When referencing etymology, it is intriguing how sources uphold autochthonic theory since *idea*, as a term, is recorded as "the concept of a thing in the mind of God" (late 14c.)¹⁴ and from the Latin, "an archetype."¹⁵ Further conceding ideas as "a conception, image or related object within the mind,"¹⁶ this animated spirit can be theorized as having its own prototype from the divine, and is adaptable to suit the purposes of the inspired artist¹⁷ (Fig. 2.4).

Consulting Random House's definition of the subjective (2023), we next see a description of something "existing in the mind or pertaining to an individual's moods and opinions" and "relating to the inherent nature of a thing." By extending our definition of art, we also recognize that a dichotomy exists between art's dowered life and a designated vehicle, which accommodates that spirit. If applying this aesthetic to abstract ideas, we thus have an artistic subject, or "...that which is placed under the authority or dominion of another sovereign, or something else; brought under thought or examination; that in which any quality or attribute inheres to." The occupation of autochthony within an artistic subject will likewise be termed as *inhabitance* (Fig. 2.5).

¹⁴ Online Etymology Dictionary.

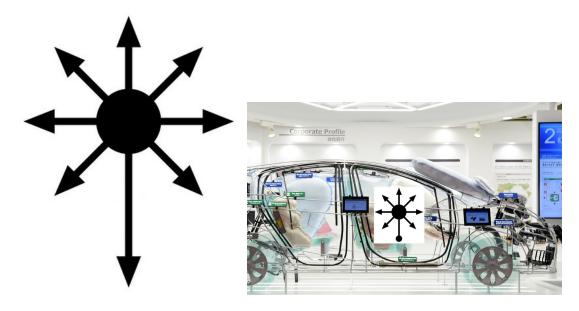
¹⁵ Ibid.

¹⁶ Oxford English Dictionary.

¹⁷ Interestingly and though perhaps known more widely as a form of psychology that interprets patterns or configurations holistically (*Oxford Research Encyclopedia of Psychology*), *Gestalt*, as employed by German philosopher Georg Wilhelm Friedrich Hegel, translates to "shape of spirit" and that which "brings itself into subjection." (*Phenomenology of Spirit*, 687-688).

¹⁸ Collins English Dictionary.

¹⁹ Webster's Dictionary.



Figures: 2.4 Sentient ideation; 2.5 Vehicular inhabitance

2.1.1.2 Artistic Subjects

As discussed previously in Chapter 1, music and architecture have been compared innumerable times, however my first contention of this dissertation is that they are not equitable by way of their respective branch, or "denomination" of art. Traditionally, fine art has included music, although a consensus as to what strictly belongs to that greater catalog as of yet, is still lacking (Batteaux argues for five subjects [3], Smith for seven [prg. 3]). Architecture, by way of some authors, has been placed among the fine arts (Gambrill, p. 60), but others have claimed that it belongs to a different category (Collins, prg. 1).

I present an alternative case, where fine art occupies a principal, or ascendant status, ²¹ since its work is primarily engaged within the domain of the imagination. If there

²⁰ Terminology borrowed from the Oxford English Dictionary, where a class of things is qualified by name or title, especially within religious office where again, a higher form of authority is represented.

²¹ Other philosophers, like Schopenhauer for example, have arranged the fine arts within a hierarchy according to how the will is suited in complexity (*The World as Will and Representation*, 1818, Vol. 1), although he still recognizes that life is "called up before (the) imagination" (§54).

are multiple fine arts that have life within and to coin a term, they can be said to be *isothonic*, or describing an artwork with one primary denizen, or inhabitance of autochthony. Purporting that fine art is further comprised of theater, dance, music, sculpture, painting, and poetry, we distinguish each artistic subject by its auctorial, ²² or inaugural reason for being, even when those subjects might mix experimentally (e.g., a three-dimensional painting appearing like a sculpture). If art likewise receives autochthonic life, its vehicle then embodies a uniquely originating cause. Accordingly for the six fine arts, the following explains their essential determination (List 2.1).

List 2.1: Artistic Morphology

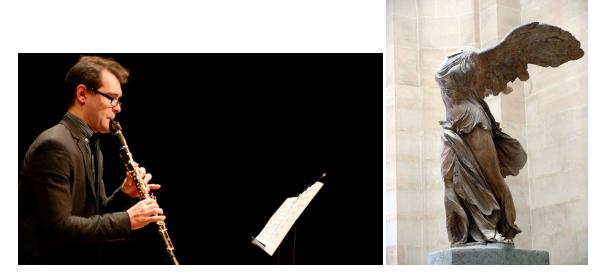
Causation	Subject
$World^{23}$	Theater
Motion	Dance
Emanation (Fig. 2.6)	Music (Fig. 2.7)
Build (Fig. 2.8)	Sculpture (Fig. 2.9)
Tegument (Skin)	Painting
Missive (Message)	Poetry

²² Although perhaps antiquated, this term's meaning, "pertaining to an author" (Random House Dictionary) "or source to a right or title" (Merriam-Webster Dictionary) will be more specifically applied, when naming an artwork.

²³ To better comprehend autochthonic theory, I believe it helpful to read, "theater embodies the world of artistic life," for example.



Figures: 2.6 Causal emanation; 2.7 Causal build



Figures: 2.8 Musical subject (*Zanelle*, composed by Viet Cuong and performed by Gleb Kanasevich); 2.9 Sculptural subject (*Winged Victory of Samothrace*, circa second century B.C.)

2.1.1.2.1 Sponsored Denominations

For disciplines outside of fine art, though amid substantial debate, it is worth mentioning that design is typically construed as being different than art (Philips, p. 1), and this leads to our next topic. If accepting art as autochthonic life that is conscionably imparted to an aesthetic vehicle, design would be authorial volition, or a lower grade of life being conscionably limited to a practical medium. Thus when designing a stapler, creativity is required, yet its function is bound by how useful the mechanics are to fasten two pieces of paper together, for example. Since life may be disbursed across different degrees of authorship, we develop related terminology, as *dithonic* sponsorship would encompass both autochthony of the imagination and human autonomy as self-sufficiency, with greater emphasis on the latter's utility. Equating the sum of art-plus-design with the applied arts (List 2.2), we see how architecture is an offshoot of sculpture and in my opinion, how sculpture is the "missing link" between music and architecture, a correlation* that many scholars historically have overlooked.

List 2.2: Artistic Taxonomy A

Fine ²⁴				Applied
Theater				Fashion
Dance				Gymnastics
*Music				Rhetoric
*Sculpture				*Architecture
Painting				Illustration
Poetry				Literature
	Art	+	Design	

As counterpart to design among prevalent scholarly debate, craft is also seen as being different than fine art (Markowitz, 55). Originating from art as autochthonic life that is conscionably imparted to an aesthetic vehicle again, craft would be lower authorial volition, yet conscionably limited to a provisional medium. Thus when crafting a vase, creativity is required, yet its purpose is bound by how prepossessive the method is, for example, when shaping the means of clay. Prepossession contemplates life, but declines on elevating autochthony within said vehicle, and hence why its ware might have a "folksy" (Boardwell, prg. 1) or even amateur appearance (Knott, p. xiii). Life is disbursed across complementary authorship from design, so *bithonic* sponsorship would encompass both autochthony of the imagination and human autonomy, with the latter having emphasis on this preoccupation. Equating the sum of art-plus-craft with its division for the decorative

²⁴ Just as italics are used for titles or specialized terms (Kent State, prg. 1), it can also be inferred that subjectivity inhabits elevated characters, as demonstrated in this word, for example.

arts (List 2.3), we see how furnishment²⁵ is an offshoot of sculpture, and it being the contraposition to applied architecture.

List 2.3: Artistic Taxonomy B

Decorative				Fine
Jewelry				Theater
Body-building				Dance
Luthiership				Music
Furnishment				Sculpture
"Interioration" ²⁶				Painting
Calligraphy				Poetry
	Craft	+	Art	

By logic of denominations branching off laterally and in higher or lower degrees from the fine arts as being central, we've established a basis for this dissertation's comparison between music and architecture, with sculpture as "mediator" between subjects. Research might continue beyond the applied and decorative arts into other subjects such as the industrial arts under design, or the domestic arts under craft, for example, and a trend would be detected as design seemingly has greater emphasis upon autochthony's embodying shell, while craft seems to have greater emphasis on an aesthetic

²⁵ Though listed in some dictionaries as being obsolete (Webster's Unabridged) or its plural being archaic (Merriam-Webster), British English employs this term to mean "the act of furnishing; the quality of being furnished; an article or articles of furniture" (Collins).

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²⁶ A coined term which formally recognizes the crafted tegument, or "covering" of auctorial causation (e.g., decorative rugs, stained glass windows, wallpaper, etc.).

idea's conceptualization. Still as those topics are beyond the scope of this committed study, Figures 2.10 through 2.13 serve to represent how the artistic connoisseur might appreciate where inspired subjects are able to switch between different grades of creativity.



Figures: 2.10 Artistic music (Orion String Quartet at the Seabury Center in Westport, CT); 2.11 Designed rhetoric



Figures: 2.12 Artistic sculpture (*Tiberinus* in Piazza del Campidoglio, Rome, by Michelangelo Buonarroti); 2.13 Designed architecture

2.2 Spectral Methodology

Having initiated a suitable premise, artistic analysis will be conducted using ontological Spectra, or systematic categories that encompass fundamental to advanced concepts, and then applied between music, sculpture and architecture. Each Spectrum table defines four terms while proceeding from lower-to-higher orders of rational inquiry, though a more familiar description of this method includes the "what / how / why / whowhen-where" of a dissected subject. Having four terms also implies a cyclical phenomenon, where the procession of an idea is developed and then satisfied under a certain premise. For example in Spectrum 2, where three musical dimensions (duration, pitch, volume) and a fourth element (timbre)² are listed, their sum figuratively stages three axes of Cartesian space, while a musical note is fabricated within those axes as the populating object. Given limited space, only the first three tables* will be consulted, with occasional reference to functions belonging to higher orders.

¹ Occasionally dubbed the "Kipling" method from Rudyard Kipling's alliterative text in *Just So Stories* (p. 83) and formerly attributed to Hermagoras of Temnos' (fl. 1st century B.C.) "seven circumstances" (what, why, who, when, where, in what way, by what means), more recent scholarship (Sloan, 236) has sourced the "5 Ws and How" to Aristotle's *Nicomachean Ethics* (circa 384-322 B.C., Book 3).

² When assigning magnitudes to the musical subject under Spectrum 2, our study of *timbre* will have coincided with traditional definitions ("A term describing the tonal quality of a sound" [Grove Music Online]), yet our Spectrum Catalog's terminology will employ more generalized meaning, regarding its sonic surface.

Table 2.1: Spectrum Catalog

Hypothetical Order	Analytic Table	Canonic Terminology	Operative Query
*1.	Perceptive Manifestation	Agency Substance Station Motility	Articulate aspects
*2.	Spatial Dimensions	Surface Duration Pitch Volume	Additive elements ("what")
*3.	Stylistic Language	Constitutional Structure Tensile Accordance Modular Composition Operable Means	Multiplicative factors ("how")
4.	Creative Purpose	Technical Negotiation Embodied Representation Emotional Expression Social Syndication	Exponential objectives ("why")
5.	Historical Context	Innovation Development Transformation Consummation Modes of Communication	Conditional positions ("who/when/where")
6.	Individual Aesthetics	Comprehension Affectation Content Fulfillment	Ideal criteria
7.	Authentic Value	Inspiration Contribution Catharsis Influence	Virtual qualities

2.2.1 Preparatory Application

Having established that life can inhabit various forms of art (Fig. 2.14), we acknowledge that autochthony may be imperceptible, but aspects of its presence do manifest themselves in a palpable manner (2.15). Thus, while a person would normally have five faculties concerning sensory input (e.g., sight, hearing, taste, touch and smell),

the function is the same for either the casual or committed observer: to access its essential spirit when experiencing an artwork. Subsequently at this point, we will focus on the reciprocation between implanted, or inner autochthonic life and its exterior aesthetic vehicle.

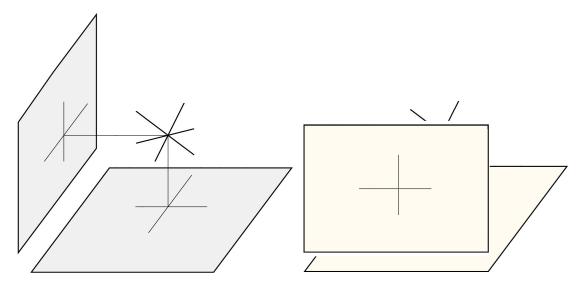


Figure 2.14: Assumed inhabitance; ³ 2.15: Essential reciprocation

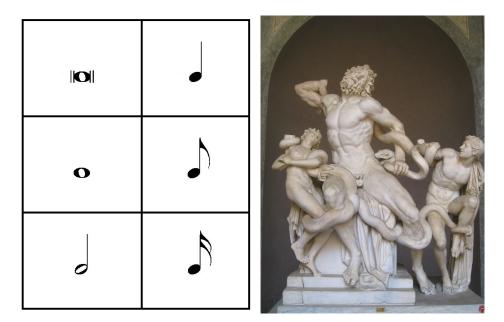
2.2.1.1.1 Corporate Article

When considering the parallels that connect music, sculpture and architecture, we are to look for a common starting point, yet that may be among the more confounding details to discern. For example and as previously mentioned, sculpture and architecture are physically tactile arts, yet music is primarily comprehended through auditory phenomena. Because each art is unique in causation also, we may find that some operations might not obviously transfer between subjects. Nevertheless, when beginning with a premise that life

³ This image is sourced from a publication ("3D Reconstruction from Multiple Views", Goy, illustration 1) concerning projective geometry, a field which studies surface mappings and lines of perspective. Despite its immediate fascination, this topic would be properly discussed in Spectrum 5 regarding "cinematic" perception for spectators during the artistic experience.

has been implanted within the musical subject to "germinate," let us start with the musical note.

Conceptually the note can be envisioned as a capsular emission, if accepting music's causation and the rest of its sonic apparatus as an emanating body. Despite being a tangential topic, notation represents this invisible object symbolically (Fig. 2.16 with a note and its count-variations), although other arts could exemplify the idea of a generative product more suitably; sculpture doesn't necessarily secrete a pod-like item, but given its causality, the artwork's inner seeding would manifest into a built form, or shell as a whole. Interestingly with latent subjectivity and if one could imagine a sculptural breach, this aperture would function as the source of bursting sound, yet its corporeal opening remains mute (2.17, whose central figure among three other forms, has an open mouth); architecture has a releasable carrier like music, yet inhabitation of the building's encasement is practically shown by the personal occupant (2.18).



Figures: 2.16 Musical note; 2.17 Sculptural form (*Laocoön and His Sons*, attributed to Agesander, Athenodoros and Polydorus from Rhodes, Greece, circa 27 B.C. to 68 A.D.)



Figure 2.18: Architectural occupant⁴

2.2.1.1 Perceptive Manifestation

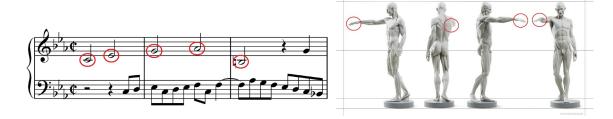
Having corroborated the inner side of an artwork, where subjective life is kept, let us initiate a reciprocal method for probing the outer, or the perceptible side of an aesthetic vehicle (Figs. 2.19-21). Intriguingly and thus noting another significant discrepancy between music and sculpture as the progenitor of architecture, the attention of the observer might fix upon what would appear to be a dynamically moving subject (Fig. 2.22), or one that again could be moving rigidly, perhaps by a supportive drive (2.23). Otherwise for architecture, attention typically remains fixed upon a certain feature, as the observer themselves are moving (2.24).

⁴ Partial disagreement with Jencks, who argues that light fixtures parallel bass notes ("Are Musical Chords Like Space?", ils. 6). While my current thesis proposes that the proper parallel to musical notes are architectural occupants, ornamental fixtures could well associate with notational indicators (e.g., a *crescendo* sign fixed upon a measure's "wall"; extended topic under Spectrum 3). The alluring connection between variegated light and sounding tone is more readily discussed under Spectrum 2 (I.1.D).





Figures: 2.19 Observant attention, music; 2.20 Idem, sculpture (Water-moon Guanyin, Chinese, 10th-late 13th centuries); 2.21 Idem, architecture



Figures: 2.22 Concentrated articulation, music (Johann Sebastian Bach, *The Musical Offering*, BWV 1079, mm.1-3, 1747); 2.23 Idem, sculpture (study of Jean-Antoine Houdon's *Flayed Man*, 1767)



Figures: 2.24 Concentrated articulation, architecture

To likewise discern how autochthony is manifested, the following table presents four aspects of perception concerning the artistic subject:

Spectrum 1 (List 2.4)

- I. Discerning Perceptive Manifestation to outwardly demonstrate the inner capability of artistically supposed life
 - 1. Agency
 Membership by which the artistic subject exercises animation
 - 2. Substance

 The material by which an artistic subject subsists
 - 3. Station

 The base by which an artistic subject presides
 - 4. Motility

 The course by which an artistic subject actuates, or moves

1. Agency

In sculpture, agency is most commonly animated through statuary, although its form doesn't have to be humanly personified and could be freely abstract (Fig. 2.26) or embodying the animal kingdom, for example; architecture often distinguishes itself from interior design, when preoccupied with sheltered construction, such as a pavilion (2.27); in music, the agency would be animated through a kind of conformation that is projected by the performing ensemble. Here attentive prospects are guided around a focal point, as formal structure would eventually be built upon the group's encircled field (2.25).







Figures: 2.25 Musical conformation (Danish String Quartet at the Daniel and Joanna S. Rose Studio of the Chamber Music Society of Lincoln Center in 2014); 2.26 Sculptural formation (Alexander Calder, *Flamingo* in Chicago, IL, 1973); 2.27 Architectural construction (Dallas Retirement Village pavilion as designed by Romtec, Inc.)

2. Substance

For the substance of sculpture, its built art is ordinarily animated through plastic⁵ material that is suitable to practical shape (e.g., marble [Fig. 2.30], etc.), yet durable enough for permanent exhibition; the materials of architecture share many of these attributes, yet often are subject to greater processing for natural preservation and industrial integrity (2.31; treated wood or weathering steel, etc.); when noting how music is invisible to the eye, but audibly perceived and manipulated through vibration, its material can be described as ethereal, with some reference to the ancient concept of ether as a pervading cosmological medium (2.28). More elementally and if recognizing where the plastic arts use physical solids, music is setting air into motion and thus is employing the gaseous state (2.29).



Figures: 2.28 Ethereal matter for music; 2.29 Aerial substance; 2.30 Plastic for sculpture; 2.31 Solids for architecture

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⁵ Conventionally, the plastic arts include sculpture and ceramics through physical manipulation (Encyclopedia of Art Education), although some sources cite painting and photography, as opposed to music and poetry (Merriam-Webster). Those materials include that which can be carved or cut, such as wood or glass (Art History Archive).

3. Station

Regarding station and because sculpture is a static art, the base by which the form (Fig. 2.33, yellow circle) presides would usually be conceived upon a larger dais (2.33, red square), much like the stage (2.32, red) by which musical conformation (2.32, yellow) might be situated. Still, if the agency of music results from focal projection by a performing ensemble (2.32, orange ring), sculpture would mount centrally (2.33, orange) within a larger platform; for architecture, grander homes (2.34, yellow) may be situated on the foundations of a manorial estate (2.34, red), while noting how a building's structure is typically hollow (2.34, orange) and how a sculpture's might be thoroughly solid.



Figures: 2.32 Musical cynosure; 2.33 Sculptural mount (August Rodin's *The Thinker* on premises at the National Museum of Western Art, Tokyo, Japan)



Figure 2.34: Architectural estate

4. Motility

Lastly, where music is conventionally deemed a performing art while sculpture has been described as a static art, music is activated by vibration from a sounding source (Fig. 2.36) and its presentation can be conditioned by a contingent ensemble, and how players are placed (2.35); motion can still be effected in a kinetic manner for sculpture through natural means (for example, twirling in-lays by air [2.37] or spouting water), while architecture might have swinging doors or windows for personal access (2.38), or more functional engineering to maintain the operations of a building (turning paddles by water in a flour mill, for example).



Figures: 2.35 Musical vibration; 2.36 Sounding source





Figures: 2.37 Sculptural actuation (Anthony Howe, *About Face*, 2012); 2.38 Architectural action

2.2.2 General Application

Having compared music and sculpture as confederates of the fine arts, our study descends from a purely imaginative source of inspiration, by including architecture as a representative of the applied arts. Even as the applied arts are more grounded by the practical component of design with human autonomy, all three subjects come to occupy space and time by experience,⁶ where freedom of the observer should be accommodated, so as to properly experience and access autochthonic spirit. The following lists the populating features of artistic domain accordingly.

⁶ The topic of physics alongside art is obviously vast, however if adopting the present argument while upheld through the research of Douglas, Geczy and Lowry ("Where Is Art?", p. 30), a basis is outlined for our continued model.

List 2.5: Artistic Domain

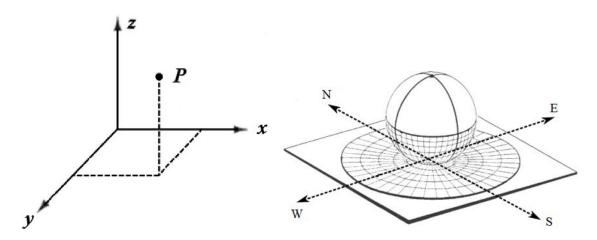
Object A physical article (Fig. 2.40) Space A three-dimensional domain (2.39)

Orientation The observer's position in relation to the points of a 3D compass (2.40)

Scope The focused view within a sphere of influence (2.41)
Scale The proportional size within an attendant sphere (2.42)

Time A hypothetically circumvolute "motor," which impels experiential

creative life (2.43-45)



Figures: 2.39 Environmental space; 2.40 Physical object and oriental compass



Figures: 2.41 Converging scope; 2.42 Proportional scale (borrowed from model trains)

Within our six stated fine arts, theater, dance and music customarily belong to what are deemed the performing arts (Davies, 19-20), while sculpture, painting and poetry

belong to what has been called the static arts. As postulated before, architecture branches off sculpture, yet this doesn't appear to mitigate the difficult nature of conceiving time, particularly for articles that we perceive as fixed. Horological theories are similarly vast, but if accepting time as being concealed, while drawing on a contemporary argument that conceptualizes its mechanics as a kind of global toroid (Meijer, 365), time is an important facet that is perpetually present. Thus regarding sculpture and architecture, for example, their art typically occupies a momentary instance, owing to their general immobility and permanence. How this central motor assimilates into reality can be also represented, where notated music shows time's passage through the turning of pages, and how music's temporal functions appear to center from within (Fig. 2.43); because sculpture is able to embody artistic ideas, we transition to the horologic phases of an actionable form (2.44); flipping those functions outward, architecture naturally relies on astronomical phenomenon, as found in daily solar rotation or the annual turn of seasons, for example (2.45).

⁷ Other connoisseurs have used the *visual* or *literary arts* for sculpture and painting and poetry (Word Hippo), although I would be in agreement with those who have argued for one complementary term to the *performing arts* (Moore and Varchaver, 349).

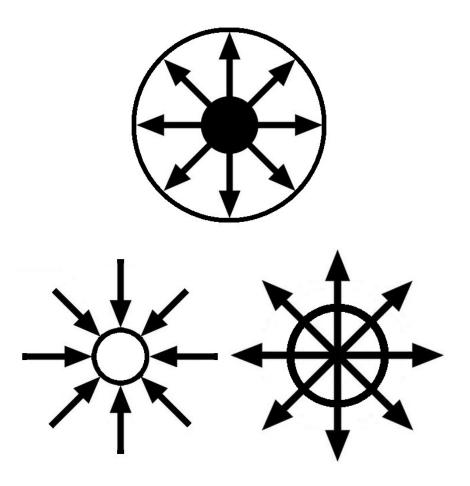


Figures: 2.43 Musical chronology; 2.44 Sculptural horometry (Peter Jansen, *Runner*, 2007); 2.45 Architectural astrometry

2.2.2.1.1 Experiential Versatility

It is worth noting between the fluidity of music and relative permanence of sculpture and architecture, how the spectator is compelled to perceive each art form. For example in music, a cinematic occasion could be described where the live audience usually remains seated, while sounding melodies or motives effectively "swirl" by in passing time (Fig. 2.49). Also note how music's imagined appearance seems to depend on which direction the performers and audience are facing, yet the totality of the sonic experience would assume a full circle, if honoring psychological tendencies to close a geometric figure

(Koffka, Chapter IV; 2.46); by contrast in traditional sculpture, the observer must circumnavigate the entirety of a form's base (2.51), in order to fully comprehend a central meridian⁸ axis (2.47). Though kinetic sculpture might provide a rotating form (2.50), these convolutions represent a major distinction between the performing and static arts, since architectural spectators are compelled to walk around a building in order to more fully appreciate its outward features (2.52; architecture further realizes a hybrid approach since occupants are able to penetrate a building's premises, but that discussion belongs to Spectrum 5 successively [2.48]).



Figures: 2.46 Orbicular perspectives; 2.47 Meridional idem; 2.48 Transversal idem

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⁸ An imaginary circle running along a surface from pole to pole, forming lines of longitude over a sphere (A Dictionary of Geography).









Figures: 2.49 Musical versatility; 2.50 Sculptural idem (David Černý, *Head of Franz Kafka*, 2014); 2.51 Idem (Sol Lewitt, *Splotch 15*, 2005); 2.52 Architectural idem (Merchants' Exchange Building in Philadelphia, PA)

2.2.2.1 Spatial Dimension

Moving into dimensions for each artistic subject, we define a more pronounced manifestation when realizing that the system of music occupies a virtual world, while sculpture and architecture function within physical reality. Still for time and space, orthogonal mapping is measured through additive/subtractive (x), multiple/divisional (y),

and logarithmic/exponential (z) units across the musical surface, just as sculpture and architecture can be gauged by exacting magnitudes accordingly.

Spectrum 2 (List 2.6)

- I. Defining Spatial Dimensions elemental measures that make-up an artistic whole
 - 1. Music

A. Duration

- i. Beat- a regular reoccurring pulse (e.g., regular/irregular)
- ii. Meter- a group of reoccurring beats (e.g., 2/3/4/5 [+/-] beats in a group)
- iii. Rhythm- a pattern of notes distributed over the beat (e.g., short/long)
- iv. Tempo- the speed of the beat, interlocked with demarcated notes (e.g., fast/slow)

B. Pitch

- i. Register- the vertical locus of a note (e.g., high/low)
- ii. Range- the distribution of notes per moment (e.g., narrow/wide)
- iii. Texture- the number of notes in a musical space (e.g., thin/thick)

C. Volume

i. Dynamics- the amplitude of a sounding note (e.g., quiet/loud)

D. Timbre

- i. Tonal color- a kind of sounding hue (e.g., warm/cool)
- ii. Tonal radiance- a property of sonic luminosity (e.g., bright/dark)
- iii. Tonal grain- the traits of a sounding surface (e.g., pure/noisy)

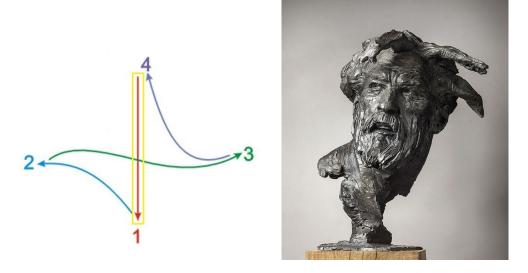
II. External Appearance

- 1. Music
 - A. Envelope- wave contour as incited by energetic impulse
- 2. Sculpture
 - A. Profile- the shaped outline of statuary
- 3. Architecture
 - A. Feature- attributes of a building facade

1. Duration

A. Beat

To begin establishing order, we start with the beat as a pulsation of regularity, musically shown by a conductor and their pounding tactus (Fig. 2.53); because sculpture is traditionally viewed as a singular moment, its foot can be seen as a parallel occurrence, just as statuary becomes notable when punctuating a grounded base (2.54); pillars serve a similar role of founding into the earth and interestingly, columns with decorative entablatures, or roofing substructures, themselves are traditionally deemed "orders." Illustration (2.55) subsequently shows the Ionic, Doric and Corinthian classics of ancient Greece.



Figures: 2.53 Musical beat; 2.54 Sculptural footing (Christophe Charbonnel, *Goliath, étude [Tête]*, 2016)



Figure 2.55: Architectural column⁹

B. Meter

Moving to metrics, a unifying element emerges when abiding by the cyclical nature of order. Thus in music, beats reoccur in groupings (Fig. 2.56), be it simple or complex (2.57); although conceptualizing may be easier when seeing equidistant points on a ringed circle, for example in sculpture (2.58), it is worth including a parallel, and exceptional illustration of painting from the static arts, where a serial collage shows timing beyond a singular moment (2.59); architecture may fill the space between posts like notes between bars (2.60), however, the enclosed cornering of a room begins to suggest a deeper understanding of what is behind a musical measure (2.61).

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⁹ Jencks must be accredited for recognizing the foundational parallel between pillar and pulse ("The Cosmic Codes"), although his subsequent interpretation of rhythm is contended more thoroughly under Spectrum 2.1.C (I.1.A.iii).

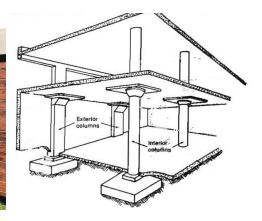


Duple Time			Triple Time	Quadruple Time
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2 4	×	×	34 1 1	4 1 1 1
22	⊗	×	3 2 2	4 2 8 8 8







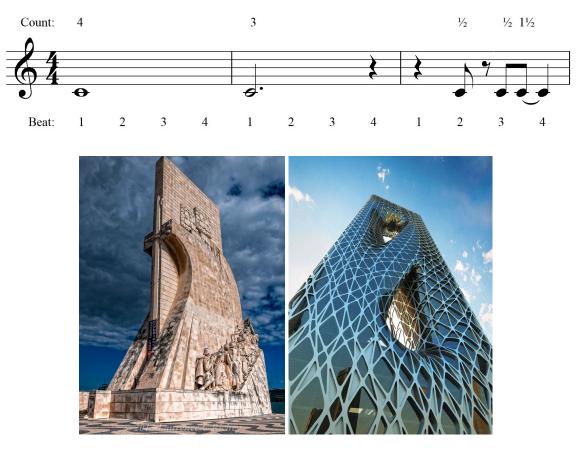


Figures: 2.56 Musical meter (excerpt from "Twinkle, Twinkle, Little Star"); 2.57 Musical time-signature; 2.58 Sculptural ring (Ned Kahn, *Wind Leaves*, Discovery World Sculpture Park, 2006); 2.59 Serial painting (Jeri McDonald, *Spanish Reds*, 2015); 2.60 Architectural posts; 2.61 Architectural cornering

C. Rhythm

Perhaps being the archetypal facet of duration, rhythm presents a compound relation between a surface "fabric" and deeper order: in music, notes materialize and are

placed above concomitant beats¹⁰ (Fig. 2.62, exercise composed by author); patterns in sculpture can be easily found among marked lines, be it some kind of tiling or long/short swathes over an assumed regularity (2.63); for architecture, patterning and tessellation can be found in more familiar constructions such as fencing (2.65) or brick-work, typically over structural frame-work (2.64).



Figures: 2.62 Musical rhythm; 2.63 Sculptural tiling (Leopoldo de Almeida with Soares Branco and António Santos, *Monument to the Discoveries*, 1960); 2.64 Architectural cladding (Sunrise Tower in Kuala Lumpur)

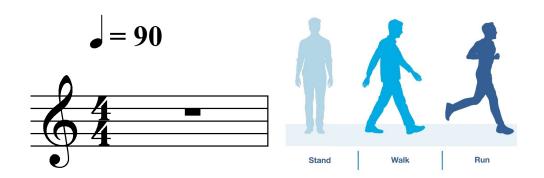
¹⁰ Musically, Jencks construed beat ordering to be the same as rhythmic patterns, although later corresponding notes and timing properly, when discussing the length of bay windows in the cathedral of Notre Dame ("Cosmic codes," including ils. 8) and double-walled insulation over exhaust stacks at the School of Slavonic and East European Studies in London ("Extreme emotion and neutrality," 14).



Figure: 2.65 Architectural boarding

D. Tempo

Lastly under duration and because tempo presents a compound relationship, versatility becomes a prime function when translating timed ratios into mathematical scale (Fig. 2.69). Likewise and if the rate of speed (2.68) proportionally equals distance over time (2.67), standard units¹¹ would have beats-per-minute in music (2.66) and meters-perminute or hour for sculpture (2.70) and architecture (2.71), when traversing around the erected structures by foot, for example.



Figures: 2.66 Musical tempo; 2.67 Clocked speed

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¹¹ Utilizing the International System of Units, which was founded by the General Conference on Weights and Measures in 1960, base units of length and time include meters and seconds respectively.



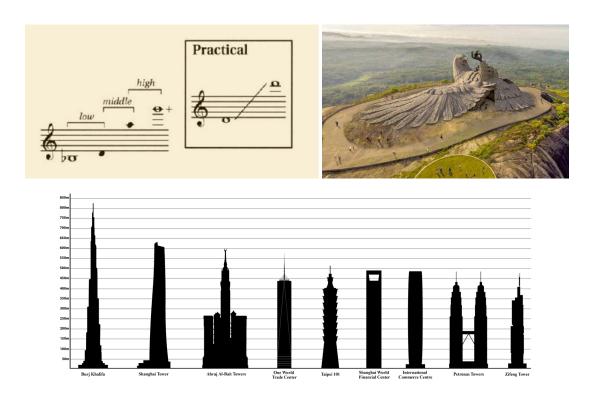
Figures: 2.68 Cadential rate; 2.69 Proportional scale; 2.70 Sculptural periphery (Keith Haring, *Untitled [Ringed Figure]*, 1987); 2.71 Architectural perimeter (Radcliffe Camera at the University of Oxford)

2. Pitch

A. Register

Moving into pitch, its dimension is vertical and its values can be plotted on the (y) coordinate. In music, this may be measured by frequency (Hertz) and by notes that are higher or lower, regarding sounding register (Fig. 2.72). Just as sculpture and architecture

are a part of the static arts, both are commonly considered vertically during singular moments (inc. stature [2.73] and height [2.74] respectively), but when orienting perspective back over time, aspects of architecture can be measured "globally" as well (for example, when traveling in an elevator from bottom to top floors, etc.). Recognizing that musical notes additionally occur over time, two Cartesian axes will eventually be used with values plotted between coordinates (x and y).



Figures: 2.72 Musical register of an oboe; 2.73 Sculptural stature (*Jatayu*, Rajiv Anhcal, Earth's Center Nature Park, India); 2.74 Architectural height

B. Range

Moving further into pitch over time, its dimension becomes more meaningful when distributing content throughout an area. Thus for music, the relation between notes can be described as "wide/narrow" vertically (Fig. 2.75); for sculpture (2.76) and architecture

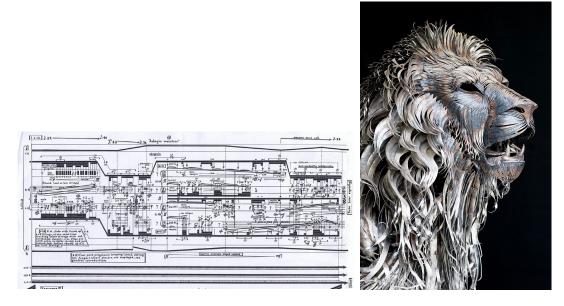
(2.77), range might be wide or narrow horizontally also between surface details, or between two aspects of their larger form and construction accordingly.



Figures: 2.75 Musical range (excerpt from Gustav Mahler's "The Song of the Earth," 1908-1909); 2.76 Sculptural breadth (Edgar Ramirez, "Male Athlete," date unknown); 2.77 Architectural spanning (Empire City Casino Porte Cochere, 2013)

C. Texture

Lastly within the rudiments of pitch, texture accounts for density across both lateral and longitudinal dimensions. In music, its sonic "tapestry" may be thin or thick with notes (Fig. 2.78); yet again for sculpture and architecture, their respective formation and construction might be teeming with detail, whether it be external plating (2.79) or a large amount of material on structural erections (2.80).



Figures: 2.78 Musical texture (excerpt from Brian Ferneyhough's *Time and Motion Study II*, 1973-1976); 2.79 Sculptural consistency (Selcuk Yilmaz, *Aslan*, 2014)

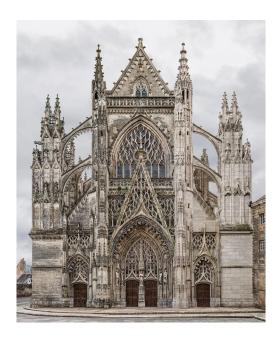
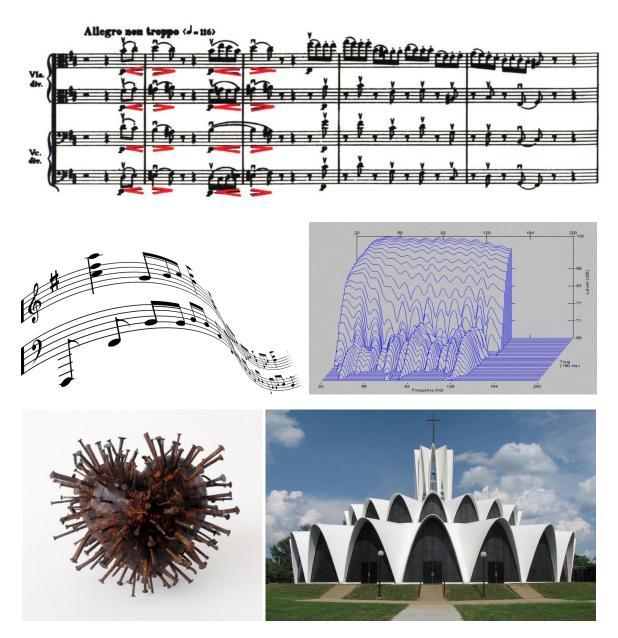


Figure 2.80: Architectural detail (Vendôme, Eglise de la Trinité)

3. Volume

A. Dynamics

As three-dimensional space is ordinarily encountered in everyday life, physical bulk can likewise be found in architecture (Fig. 2.85) and sculpture, be it solid or hollow for any fine arts subject (2.84); however and though less commonly acknowledged, perhaps, music also bears outward/inward sizing (2.82). Subsequently and if notes can be plotted over time between x and y axes (2.81) through scalar intervals (related discussion under Spectrum 3 (2.2.2.2), notes may be similarly charted onto geometry's (z) axis (2.83).



Figures: 2.81 Musical dynamics (excerpt from Tchaikovsky's Symphony No. 6 in B Minor, Op. 74); 2.82 Protruding staff; 2.83 Sonic amplitude; 2.84 Sculptural protuberance (Wayne Chisnall, *Nail Heart*, 2016); 2.85 Architectural capacity (The Abbey of Saint Mary and Saint Louis)

4. Timbre

A. Tonal color, radiance and grain

Moving into the last dimensions of our second Spectrum, these elements provide more instantaneous stimuli regarding sensory experience. Firstly, recognizing grain as having "smooth/rough" characteristics, tactile channels can be added to the visual for both sculpture (Fig. 2.89) and architecture (2.92), even if music remains primarily auditory with harmonics and formants (2.86, smaller undulations and darkened areas), ¹² while contemporary techniques permit "granular synthesis" through modifying minute samples of sound waves. While human perception of color has had two major competing theories of interpretation, ¹³ it is of interest to note how musical description relies less on the scientific hues of diffracted light (i.e., red, orange, yellow, green, blue and violet [2.87], ¹⁴ as more clearly seen in sculpture and architecture; 2.91, 2.93) and more on the tempered frequency (e.g., "warm/cool") ¹⁵ or chemical composition of sounding instruments (e.g., "brassy/woody"). ¹⁶ Otherwise, the perception of tone as "bright/dark," perhaps is the most immediately recognizable between all three artistic subjects (2.88^{17, 18}, 2.90, 2.94).

¹² Owing to mechanics of the human ear, auditory hearing employs virtual contact, when involved between sound waves and the tympanic membrane (Johns Hopkins University, prg. 1). Still as sound waves have a distinct envelope, spectrograms can be displayed through either two (Figure 2.29 a), or three-dimensional formats known as "waterfalls" (Fig. 2.30 a).

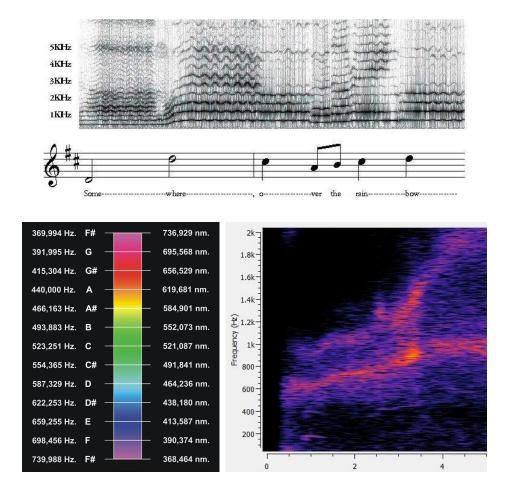
¹³ Resolved by Patterson, Neitz and Neitz (*Frontiers in Neuroscience*, 1) as being complementary through ganglion cells, trichromatic theory explains how receptor cones in the eye detect light waves (Helmholtz, Southall trans. Volume II, §19-20), while opponent process theory helps to explain how combinations and gradations of colors are visually perceived (Hering, §13).

¹⁴ As shown in Figure 2.29 b (Pasquale, ils. 14), frequency, in either Hertz or nanometers, correlates auditory and visual phenomena, though perhaps more fully illustrated by painting's oft used color wheel and music's circle of fifths. The circle otherwise is discussed in Spectrum 3 (O.), while speculation on musical, sculptural and architectural "heat" would be reserved to Spectrum 5 under contextual conditions. ¹⁵ Stumpf, "Tone Psychology" 2020, Vol. I, §5.

¹⁶ Schmidt-Jones, "Understanding Basic Music Theory" 2021, 4.2.1.

¹⁷ Stumpf, p. 18.

¹⁸ Despite a wealth of information, including energized harmonic partials over time, spectrograms do not typically illustrate bright or dark timbre. "Bright and dark" tones similarly indicate amplitude, but in this example (Blåsten, ils. 8), resonance coincides with formants and thus gives some indication of a lighter or darker tone.



Figures: 2.86 Musical grain (excerpt from "Over the Rainbow," music by Harold Arlen with lyrics by Yip Harburg, 1939); 2.87 Musical color as ramping for data visualization under Chromoscale harmonics; 2.88 Musical tone, where brighter spots vertically show resonant frequencies









Figures: 2.89 Sculptural grain (Jürgen Lingl, *Lioness, wood*, circa 2016); 2.90 Sculptural tone (Frederick Hart, *Songs of Grace: Beauty*, acquired by the State Hermitage Museum in 2005); 2.91 Sculptural color (Sean Avery, *Hummingbird*, circa 2010); 2.92 Architectural grain (Seashore Library in Beidaihe, Qinhuangdao, China by Vector Architects)

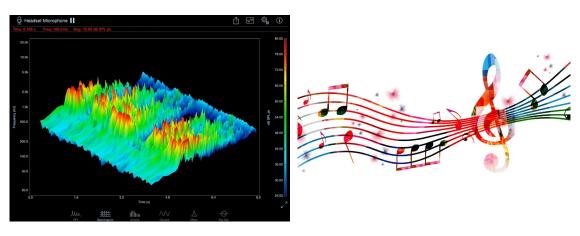




Figures: 2.93 Architectural color (Winters House in Sacramento, California, 1890); 2.94 Architectural tone (Lexicon Cinema in Bracknell, UK)

2.2.2.1.2 External Appearance

Having established orthogonal axes, it would follow that some kind of object would occupy this devised space. Music presents something of an enigma since conceptually, its notes pervade artistic space, yet current spectrograms only represent sounding waveforms (Fig. 2.95). Nonetheless and when inferring "frontal" features from architecture (2.98-99), musical notes could assume a more literal representation when notating the tone, color and grain of articulated sound (2.96). The development of such symbolization might benefit from future research and yet when translating sculpture, the efformation's tone, color and grain (2.97) might give some indication as to what the external "face" of music looks like and thus, a more apposite interpretation regarding sonic spectrographs.









Figures: 2.95 Musical envelope as wave contour (3D Spectrogram in SignalScope Pro); 2.96 Musical scoring as surface reticulation; 2.97 Sculptural profile (Anton Smit, *Oblivion of the Waves*, date unknown); 2.98 Architectural facets (Howard Engine Company No. 34 firehouse, 1864, converted to a private residence in 2009); 2.99: Architectural features (Kiefer Technic Showroom, circa 2007)

2.2.2.2 Stylistic Language

Having started from a theory of life inhabiting art and progressed to describing how its vehicle is perceived when occupying space and time, our academic survey moves towards internal mechanics and how music can function systemically. In the author's opinion, this aspect of study may be among the more insightful theoretically, when reverse engineering from architecture and sculpture back into music as an art. While Table 2.8 itemizes Spectral factors and assumes an interior-to-exterior schematic, its succeeding illustrations are sequenced from smaller-to-larger components, so as to assemble music's tonal model.

Spectrum 3 (List 2.7)

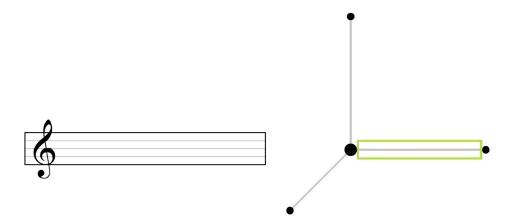
- I. Defining Stylistic Language a systematic body of communication using demonstrable gestures, characters and sounds
 - 1. Constitutional Structure: a network of interrelated parts, supporting the artistic model
 - A. Structural Tonality: the constellational engine for musical notes, synchronized around a central hub

 [Components A-D, H-T, A2]
 - 2. Tensile Accordance: the dynamic grading of pliant combinations, concerning the artistic model
 - A. Accordant Sonority: the congruent (consonant) or conflicting (dissonant) facility between musically connected notes [E-G, P]
 - 3. Modular Composition: the functional organization of modular units, encasing the artistic model
 - A. Modular Formality: the arrangement of musical sections [U-Z]
 - 4. Operable Means: the choice of implements by which to manipulate the artistic model

A. Orchestrative¹ Means: the choice of media by which to coordinate the musical model [B2]

Component A. Fundamental cell

To factor into complex organization, our most practical starting point would be the fundamental cell, or in architectural terms, a sheltering chamber (Fig. 2.103). Though perhaps surprising to hypothesize a musical measure (2.100) as acting like a functional "room" or compartment, this may be easier to conceptualize when postulating back to notes as articles and their parallel to occupants in architecture. Operations are conducted within these designated chambers and they would properly be discussed under Spectrum 4, although a sculptural cavity shows how a working matrix might be necessary when fashioning a purposeful product (2.102). To initiate this system also, our model includes a modular unit (2.101), working as a radial when accommodating three-dimensional space appropriately.



Figures: 2.100 Musical measure; 2.101 Rotary block

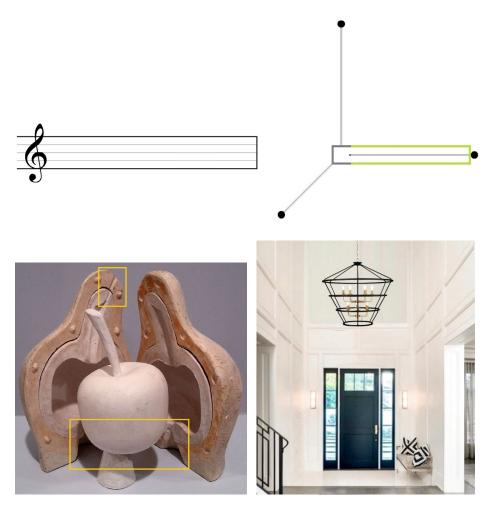
¹ Suffix adapted to the stem of a word to form the adjective and to indicate qualities of another origin, which assumedly is subjective regarding the musical art.



Figures: 2.102 Sculptural mold; 2.103 Architectural chamber (Star Chamber, Bolsover Castle, UK)

B. Rudimentary port

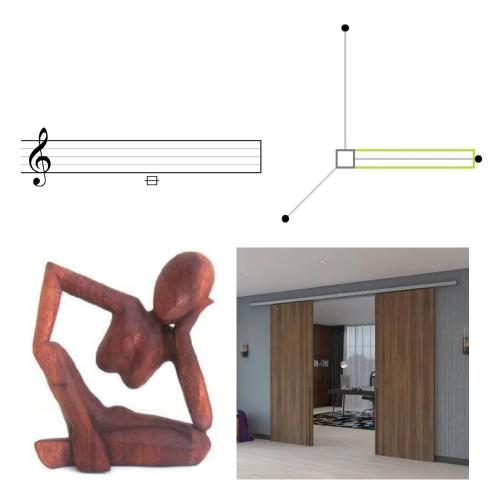
In order to properly function, we next open this chamber with some kind of portal. With time customarily flowing "laterally" (Ishihara, Keller, Prinz, Rossetti, 454) and time signatures traditionally placed in the beginning corner of a measure (Fig. 2.104), our modular construction represents this in 2.105. Returning to sculpture, matrices often use some kind of flue, when die-casting a particular form, for example (2.106). Rooms in architecture readily have entranceways, but since one of our study's objectives is to conceptualize musical structure, we'll use the atrium to represent a central space with multiple openings to be utilized for other functions (2.107).



Figures: 2.104 Musically measured entryway; 2.105 Opened berth; 2.106 Sculptural vent (photograph attributed to José-Manuel Benito Álvarez, 2006); 2.107 Architectural atrium

C.i. Simpler gate A

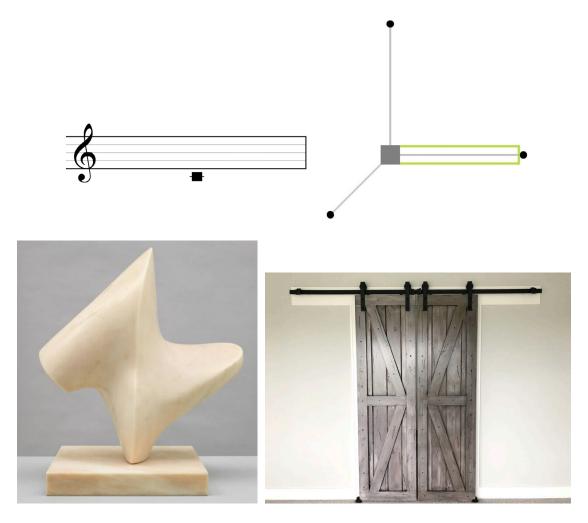
By connecting two chambers, the architectural door (Fig. 2.111) has a conceptual parallel to open sculpture, which academically has been defined as "lines and planes replacing solid volumes and enclosing surfaces" (Scheer; 2.110). Of greater interest to our musical model is the serviceable function of "on or off" when providing notes with certain qualities, be it harmonic or emotional, etc. Preparing for such attributes, the white square symbolizes an open port (2.108) and how this would access a central resource (2.109, and component D) for eventually treating notes in Spectrum 4.



Figures: 2.108 Musical tap; 2.109 Modular valve; 2.110 Sculptural orifice (Oma artisans, "Thinking Man Lost in Thought," trademark date unknown); 2.111 Architectural door

C.ii. Simpler gate B

As a principal type of regulation, a darkened square in musical notation will represent the blocked flow of content (Fig. 2.112), and within our modular arrangement (2.113). For sculpture, a closed work has been defined as "a solid opaque mass, often with an inward-directed focus" (Marder; 2.114). In architecture, a door is simply shut (2.115).

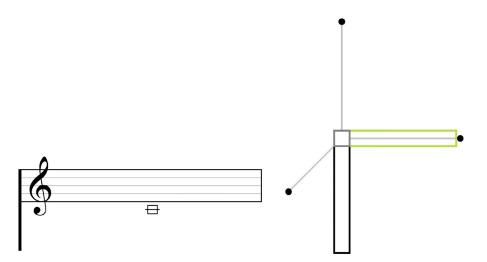


Figures: 2.112: Musically measured stoppage; 2.113 Modular cessation; 2.114 Sculptural closure (Henry Moore, *Upright Form*, 1966); 2.115 Architectural shutting

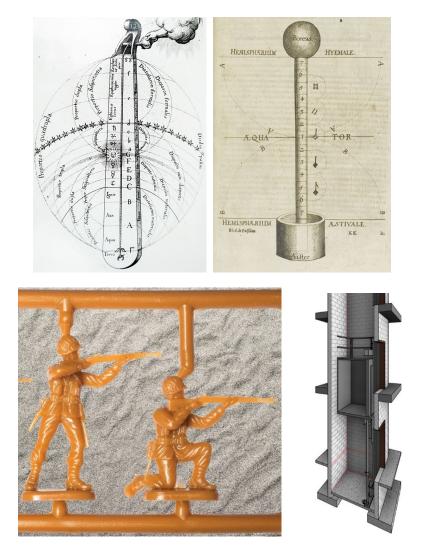
D. Central bore

For architecture, a vital factor to consider is whether a structure has access to subterranean systems, e.g., underground plumbing or elevator shafts, etc. Clearly most residential structures do not require elevator shafts (Fig. 2.121) and simpler abodes do not require multi-level stairwells, however if one of the objectives of this dissertation is to visualize the full tonal system of music, referring to more greatly evolved constructions becomes that much more relevant. Subsequently for music, we argue that the principal

which aligns the sonic system is tuning, theorized by Robert Fludd in his *De ustriusque cosmi historia, tomus I, tractatus* (1617-1624; Tract I, 90; Ammann, 202) as a cosmic monochord (2.118). Here his published illustration shows the hand of divinity adjusting a string bound to a constructed soundboard, sympathetically affected also by celestial planes while dividing musical octaves. Fludd later adapts his diagram, though and as described by Guariento (151), into the experimental process of a weather-glass in *Pulsus, seu nova et arcana pulsum historia* (1631; 2.119), where similar metaphysical powers, alongside heat, evidently affect the pressure of a rising or falling solution in a musically calibrated pipe. While the distilling qualities of this hollow apparatus would be pursued under authentic value regarding Spectrum 7 and the conception of inspiration and catharsis, we note how sculptured items may have similar channels when casting dies as well (2.120). Extending the analogy, our model similarly assumes a functioning shaft (2.117) and its structural component can be represented by a posted staff, eventually supporting specific notes (2.116).



Figures: 2.116 Musical post for structural support of its staff and notes; 2.117 Mined well

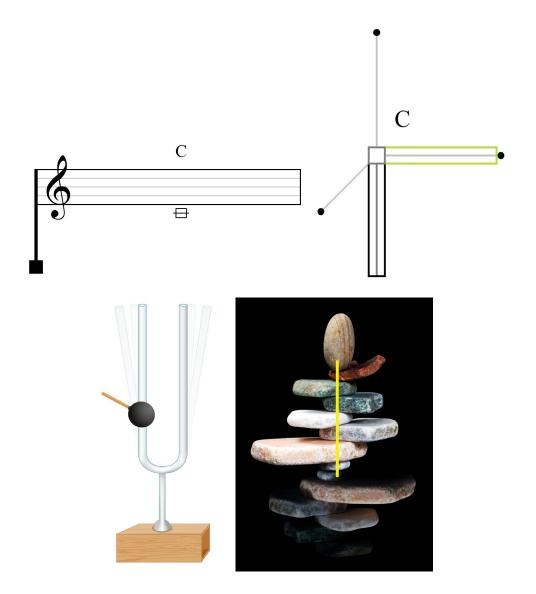


Figures: 2.118 Tuning as up-right polarity 2.119 Metaphysical storm glass; 2.120 Sculptural sprue; 2.121 Architectural shaft

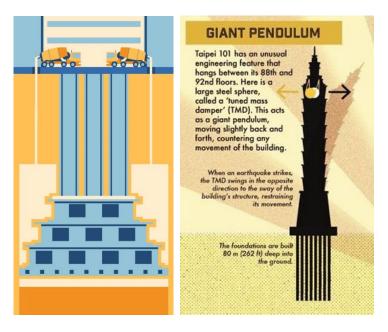
E. Physiological stability

Following our proposed shaft when grounding a structure architecturally, one option has evenly spread footing distribute its building weight over horizontally stacked beams known as "grillage," and the entire arrangement rests atop bedrock with concrete poured as an encasing (Fig. 2.126). Once grounded, taller structures like Taipei 101 (with piles) for example, can act as an oscillator, be it induced from wind or an earthquake. In

order to suppress those unwanted mechanical vibrations, weighted masses are mounted to damped springs, which themselves are tuned to the building's resonant frequency (2.127). Traditionally, most sculptures rely on a secured mounting to the earth while their substance is molecularly solid. In the art of Pascal Fiechter though, centers of gravity and mass are creatively used when poising extraordinary rock formations. The physics of the former principle involves balancing a body around which the instants due to gravity are regarded as zero, while the latter positions a body at the point at which the mass's total distribution is calculated to be zero. Rocks of various shapes and sizes thus can be seen in example (2.125), aligned with contact points in one axis. Musically our pillared staff reaches a foundational point, represented by a terminating block (2.122). Though temperament would be discussed as an extension of Spectrum 3, we assume some codified reference for our model from this and its initial systematic characters (2.123). Retreating from a chiefly theoretical domain, similar principles can be demonstrated by the classic tuning fork. The device is an acoustic resonator with two tines and typically is made of elastic metal. Being fashioned at a set pitch, when struck, it likewise emits a pure musical tone. Practically the fork is held most often by hand, yet it remains that its base can be fixed to a permanent structure, and that can affect damping during oscillation (2.124).



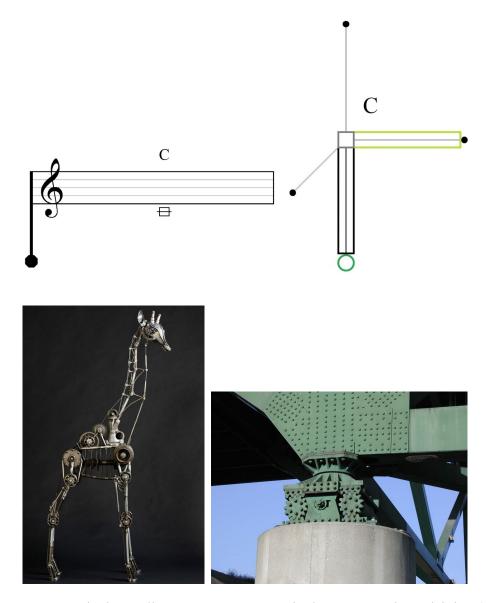
Figures: 2.122 Musical grounding; 2.123 Structural pier; 2.124 Tuning fork; 2.125 Sculptural balance (Pascal Fiechter, Counterbalance example, copyright 2007-2022)



Figures: 2.126 Architectural foundation; 2.127 Architectural equilibrium

F. Pivotal hinge

The next component continues an important distinction between artistic subjects: in music, junctures permit both dynamic motion and hypothetically, a reservoir drum for content allocation. While the module of the triad patently has three notes, its root member is deemed as having a weightier function when later comprising harmony (Fig. 2.128), and if coordinating it with the aforementioned basis (2.129). Sculpture can provide both attributes of rotation and distribution, again as a unique intermediary between music and architecture (2.130). Architecture being bound to more permanent erections, it seldomly has fulcrums for structural motion, although possible in modern bridges when designed with damping protection, for example (2.131).

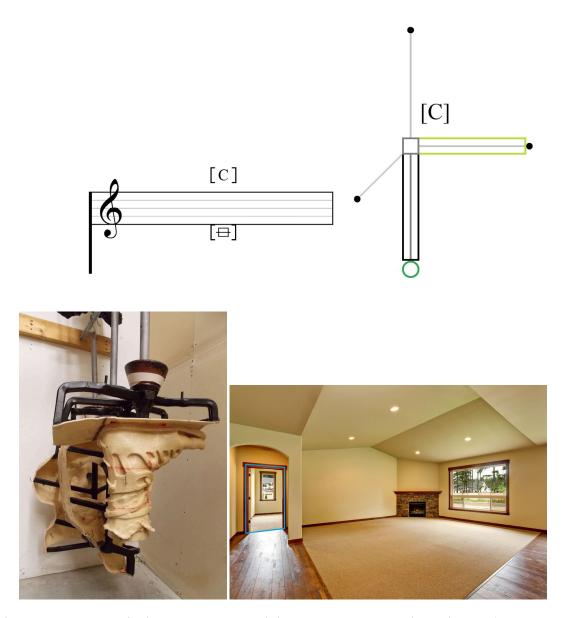


Figures: 2.128 Musical coupling; 2.129 Rotary swivel; 2.130 Sculptural joint (Andrew Chase, *Giraffe*, circa 2010); 2.131 Architectural fulcrum

G. Momentary address

Supposing that our musical system is grounded, we notate a staff's footing without the barbed symbol in Fig. 2.128, and then employ a bracket around a note's chosen portal (Fig. 2.132). This bracket accommodates notes as part of a measure's chamber and freely identifies the musical root as an operable gateway (2.133), when

connected by established tuning. Sculpture may not require such codification, outside of sprue cups for injection molding (2.134). For architecture, antechambers often serve as dressing or waiting rooms, when conjoined with a master bedroom² (2.135).



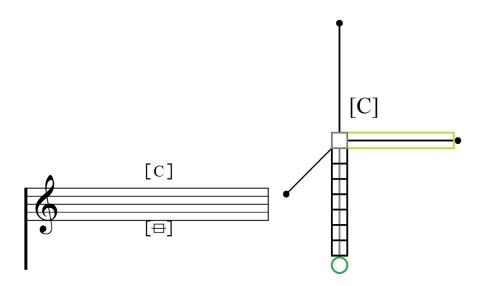
Figures: 2.132 Musical root; 2.133 Modular stem; 2.134 Sculptural seat (courtesy of Bronze Services of Loveland, Inc.); 2.135 Architectural vestibule

² Merriam-Webster Dictionary 2023, "Antechamber."

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H. Ascending grade

Our hypothetical construction continues to grow, if recognizing built-in modularity with potential outlets. Specialization can thus take place, if discharging these properties through a kind of sifting process, as in the ledgered lines of a musical measure (Fig. 2.136). In architecture, this could begin through the steps to a master bedroom (2.139) while again in music, articulated notes might emanate from the root to a higher rung (2.137). As a fine art, sculpture is able to embody the conceptual idea of a climbing tread (2.138).



Figures: 2.136 Musical steps; 2.137 Formulaic inclination



Figures: 2.138 Sculptural rise (ACME Brooklyn Props); 2.139 Architectural steps

I. Arboreal³ drive

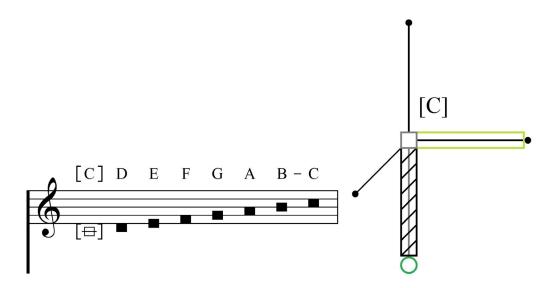
When adding to our model, constituent steps assume greater function, particularly concerning versatility between artistic subjects. Music's gradient module thus becomes a scale by consigning gates to each step (Fig. 2.140) and it seems to have both inner and spiral rotation (2.141). Chew published similar research on her spiral array model in 2000 and 2014, where a two-dimensional *tonnetz*, or pitch network most associated with Neo-Riemannian theory, is "rolled up", or generated into concentric helices and interpreted within a geometric space (2.143).⁴ The author uses the term "tonicity"⁵ to further conceptualize scale degrees as contoured intervals, where musical notes resolve between

³ Conventional meaning of this word includes "of or relating to trees" (Random House), however I'll be using a mechanical definition of its root, *arbor*: an axis that supports a rotating tool (Random House).

⁴ "Mathematical and Computational Modeling of Tonality" and "Towards a Mathematical Model of Tonality" respectively, both Part 3.

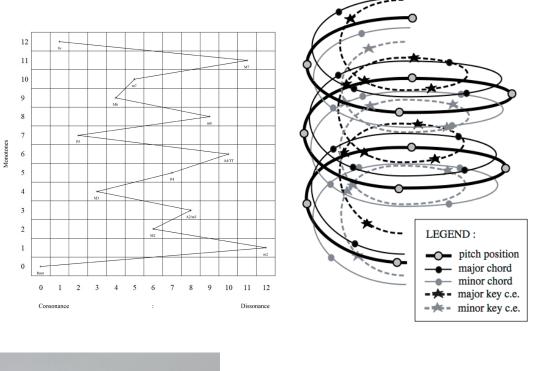
⁵ Borrowed in part from biology and its root word *tone*: "the state of sustained tension (in muscles) that is necessary for the maintenance of posture" (A Dictionary of Biology). The term's meaning is augmented by autochthonic theory regarding artistic 'life', and tonality's dynamic properties concerning the system of music.

consonant and dissonant sonorities by tonal compulsion (2.142).⁶ While the profile of this proportionate staff may not be visible or traditionally represented in musical notation, sculpture creatively shows how fibrous winding might assume a diagonal trim (2.144). For architecture, the occupant travels spiral stairs when walking (2.145) and the design of a building's steps gains importance when serving practical needs, just as the identity of a scale in music becomes significant, when eventually formulating chromatic melody and harmony.



Figures: 2.140 Musical scale; 2.141 Psycho-acoustic coil

⁶ The perception of sonority is a particularly labyrinthine topic, with compelling studies published by Lots and Stone ("Perception of Musical Consonance and Dissonance: An Outcome of Neural Synchronization", 1429) and Foo, King-Stephens, Weber, Laxer, Parvizi, & Knight ("Differential Processing of Consonance and Dissonance within the Human Superior Temporal Gyrus", article 154). However, we can alleviate some supposition about tonicity, when acknowledging classic contrapuntal technique and how notes "in the diatonic system... lead down (or) up" (Fux [1725] 1965, 39) or that "fifths follow each other... and would stand out by the diminution of the interval" (Ibid, 32), for example.

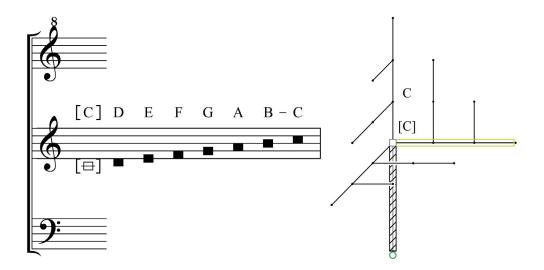




Figures: 2.142 Congruent tonicity; 2.143 Axial pinion; 2.144 Sculptural wind (Ferri Farahmandi, unknown title, circa 2000-2010s); 2.145 Architectural stairs

J. Modular accumulation

By recognizing that the classic musical scale has an overlapping cycle, its octave suggests a kind of self-containment (Fig. 2.146). This can structurally parallel the floors and ceiling of an architectural chamber between stories (2.149). To maximize space, stacking units might occur (2.147), particularly where terrain is limited for architecture, yet creativity might still parallel music's spiral mechanism (2.150). While similarities to engineering will continue to emerge in other components, sculpture can similarly represent a kind of separation within a larger structure (2.148).



Figures: 2.146 Musical octave among tessitura; 2.147 Musical stalls



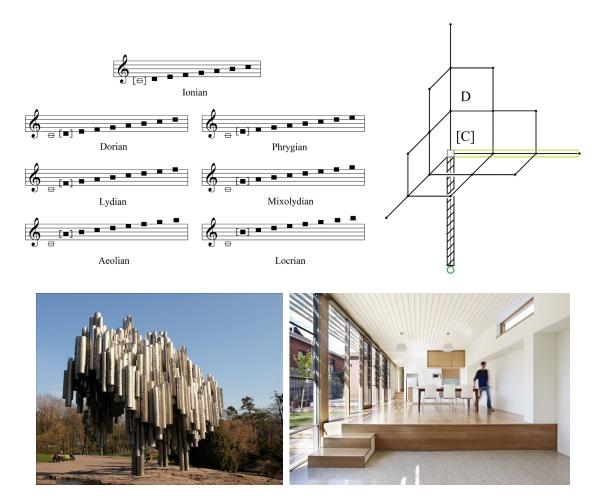


Figures: 2.148 Sculptural partitioning (Changirl Park, *The Sculpture of Gap and Rhythm*, 2012); 2.149 Architectural ceiling; 2.150 Architectural flooring

K. Multiplicative arrangement

Proposing that notes can be inserted into a chamber, our theoretical model enlarges by joining spaces at different ports, be it vertically or horizontally (Fig. 2.152). Current musicology likewise discusses the logic of six-based minor for harmonic analysis (de Clercq, no. 4), where notation assigns a fixed numbering system between parallel and relative modalities. As corroboration to this, one could conceptualize the tonic's influence as belonging to a more internal docking, as roots shift in different propensities across the scale (2.151). Architecturally this would support the erection of split-level tiers

with entrances or compartments (2.154), while sculpture would represent a formally coupled frame (2.153).

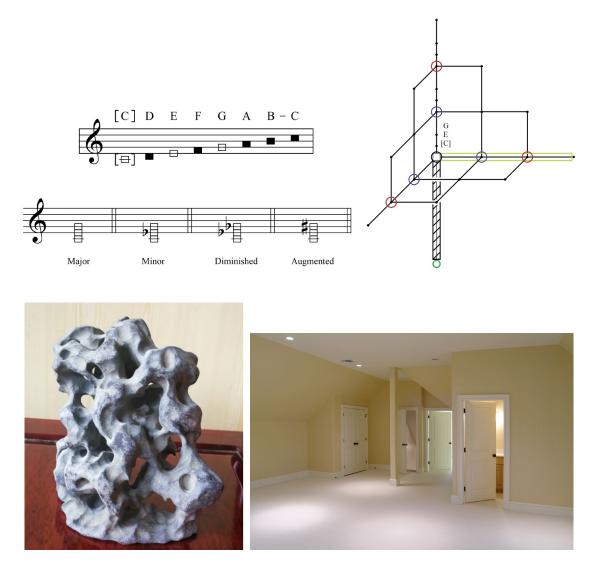


Figures: 2.151 Musical modality; 2.152 Classifiable combination; 2.153 Sculptural framing (Eila Hiltunen, *Sibelius Monument*, 1967); 2.154 Architectural level

L. Manifold configuration

By upgrading our system, various chambers and ports are now assigned a more specific function, or sonic "weight" (Fig. 2.156). Musically and as mentioned prior, the root has a certain authorization among open triadic members, while other scalar ports remain closed (2.155). A parallel to architecture would have these rooms and doors (d) be

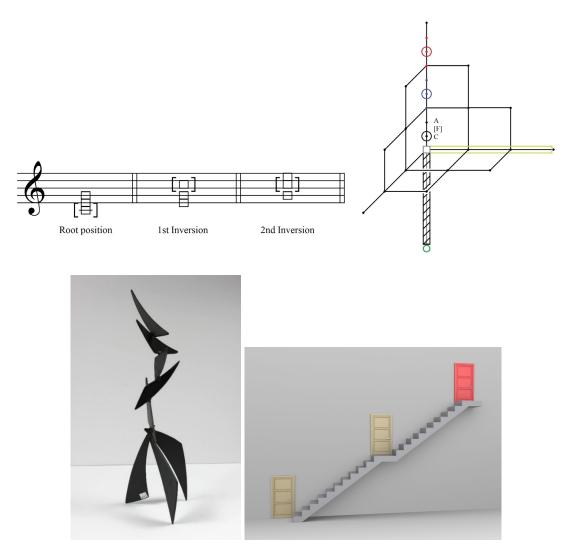
likened to an office or an unaccounted-for room, or even a closet space (2.158). A unique phenomenon arises musically, owing to how notes may appear or disappear contrapuntally between chords. While occupants may not vanish between rooms in architecture, accommodations can be made, where they may recede into deeper quarters and out of sight, as will be elaborated more fully in (2.172). Sculpture can aptly represent a network of openings, as seen in example (2.157).



Figures: 2.155 Musical triads with root; 2.156 Nodal constellation; 2.157 Sculptural grating (Jiang Chen, *Holes in a Stone*, 2019); 2.158 Architectural doorways

M. Erective modification

Continuing with modular function, portions of the musical triad can be readily shuffled (Fig. 2.159), though its root maintains the indispensable characteristic of ductile mooring (2.160). Sculpture can be easily adapted, if having sliding pieces in its design, and is often for a pleasing aesthetic appearance (2.161). Architecture shows how multiple doorways can be adjusted within a single room (2.162), though perhaps less common for occupants and their ordinary activity within a domestic residence, for example.



Figures: 2.159 Musical inversion; 2.160 Triadic permutation; 2.161 Sculptural alteration (artist unknown, "Striking Angular Late 20th Century Multi Media Metal Sculpture"); 2.162 Architecture with variable landings

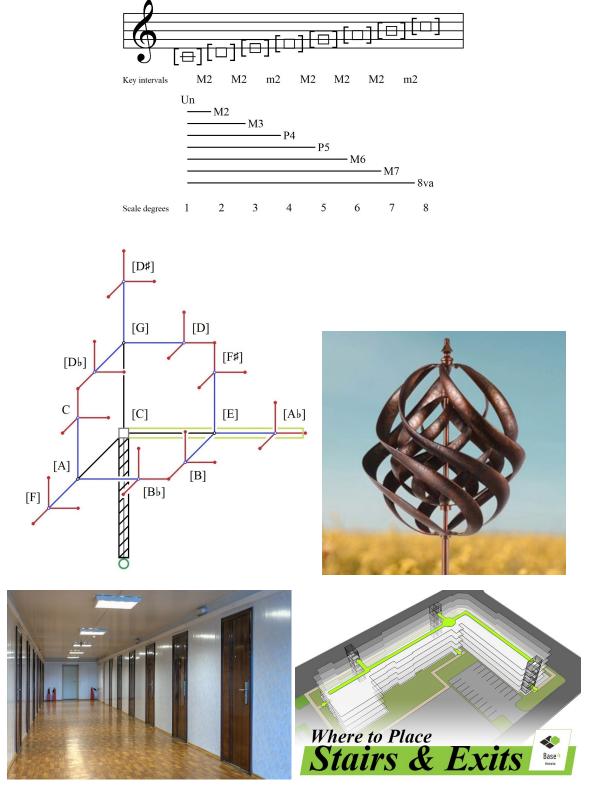
N. Constitutional structure

Accommodating numerous constituents, we now standardize those parts within an integral system. The major scale has likewise been considered predominant in Western music modality, as conventionally caused by psychological⁷ and acoustic rationale,⁸ and when defined by a fixed sequence of intervals (2-2-1-2-2-2-1; Fig. 2.163). If conjoining octaves of the major scale as components and further integrating them into a mobile system, we then have a way to represent all twelve tonal keys (2.164; arbitrary ordering, though triadic or other harmonic relations can be assumed [e.g., C: E, G, A including first radii; E: F‡, Ab, B and G: Db, D, D‡ and A: C, F, Bb as second radii; third radii preparing terminuses]). Though sculpture might rely on solid molecular structure when using organic or inorganic substances such as granite or metal, for example, it is not uncommon for sculptors to formulate reticulation as an artistic composition as well (2.165). Focusing on the structure of architecture, its framework becomes more meaningful when integrating doorways amid corridors (2.166) among the floors of a building (2.167) accordingly.

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⁷ Andrew Milne 2010, "Tonal Music Theory: A Psychoacoustic Explanation?"

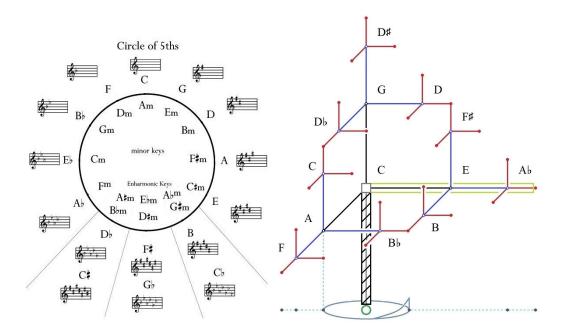
⁸ Pieter Abbeel 2011, "Musical Scale," 1; Lett, Rhys 2014, "Major Scale-Music Theory Made Easy."



Figures: 2.163 Musical key; 2.164 Proper system; 2.165 Sculptural latticework (Marissa's Garden Gift artisans, Hampsted Wind Sculpture Spinner, trademark date unknown); 2.166 Architectural corridor; 2.167 Architectural story

O. Accessible catalog

Having the self-contained system above, we can integrate this within a larger complex. Musically its revolving structure is conjoined with a kind of central cartridge (Fig. 2.168), which hypothetically affords access to a prepared repository of treated notes (2.169). The Circle of Fifths is likewise conceived as alternating between ascending or descending keys (*Grove Music Online*), as its contact points would be expanded concerning key qualities (e.g., expressive moods and colors; Young and Firth respectively) in Spectrum 5. If the corporate article in sculpture is its form, this can be accessed through a kind of fixed scaffolding (2.171), though undoubtedly capable of embodying the idea with a central roulette (2.170). Likewise in architecture where occupants access rooms or receptacles through stairways (f, interior or g, exterior), a central storage or closet-room can also be recognized as part of an integral system (2.172).



Figures: 2.168 Music's Circle of Fifths; 2.169 Staggered magazine







Figures: 2.170 Sculptural compass (Casino Cosmopol roulette); 2.171 Sculptural scaffolding (James Earle Fraser, "George Washington" on Constitution Mall at the New York World's Fair, 1939); 2.172 Architectural storage;





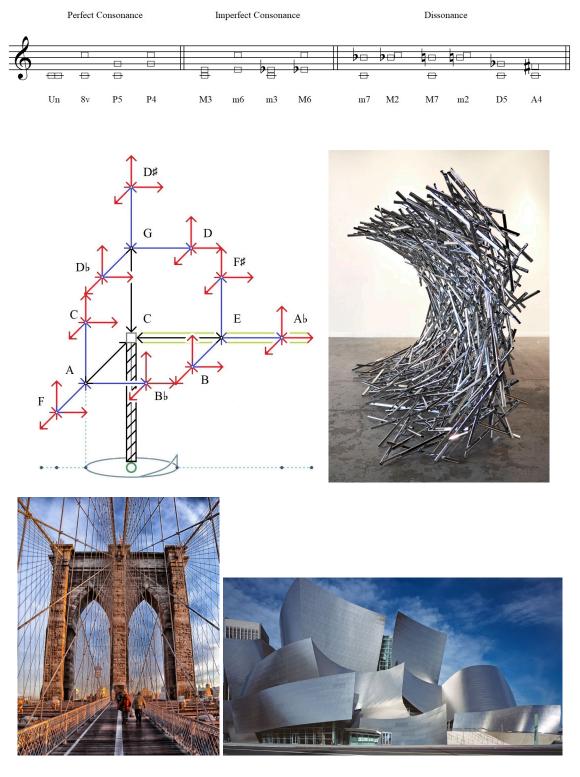
Figures: 2.173 Idem stairwell; 2.174 Idem staircase

P. Compatible Accordance

Functioning with this intact model, strength and solidity become critical, especially from the architectural point of view, where engineering is responsible for structural integrity and safety, e.g., suspension bridge cables (Fig. 2.178). Buildings can assume a more eloquent flow otherwise (2.179), just as sculpture can embody the idea of whether parts fit together cohesively or incoherently (2.177). Advancing this idea may be a unique way to conceptualize consonance and dissonance from a musical (2.175), and modular perspective as well (2.176).

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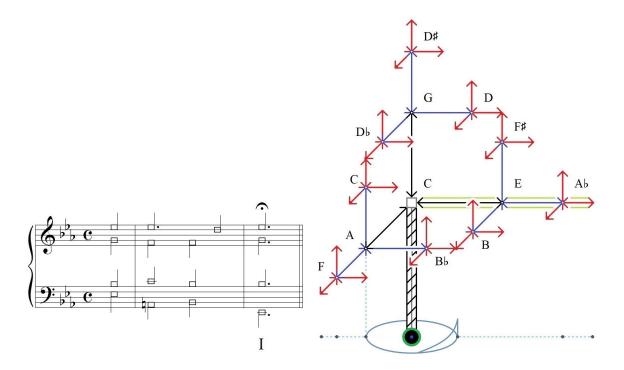
⁹ Both the National Institute of Standards and Technology ("About NIST") and the American Institute of Architects ("About AIA") provide building codes for construction practices; the former's regulations being part of the U.S. Department of Commerce, while the latter consulted with builders and attorneys to publish its Contract Documents as formal industry agreements.



Figures: 2.175 Musical sonority; 2.176 Working cohesion; 2.177 Sculptural congruence (Matt Devine, *15th Street*, 2013); 2.178 Architectural tension (Brooklyn Bridge, New York); 2.179 Architectural agreement (Disney Concert Hall, Los Angeles)

Q. Tractional core

If empowering previous additions with a mechanical core (Fig. 2.181), the crucial aspect of a grounded hierarchy is generated, though purposefully expressed in different ways across artistic subjects (and pursued more concisely in Spectrum 4): musically, the tonic is conventionally recognized as having a "gravitational," or inward pull, and this would govern compulsion across layers of notes within various keys (2.180). Sculptural propensity may be anchored to a sturdy base, working on the common assumption of gravitational push/pull as well (2.182). In response to natural forces, architecture often has its cellar as a foundation while housing utilities, and this again can be attributed to a more permanent versatility, where the basement regularly occupies a subterranean space (2.183).



Figures: 2.180 Musical tonic (J. S. Bach, Chorale, BWV 245.40, mm. 19-21; arrangement adapted from Dahn, Luke); 2.181 Weighted seat



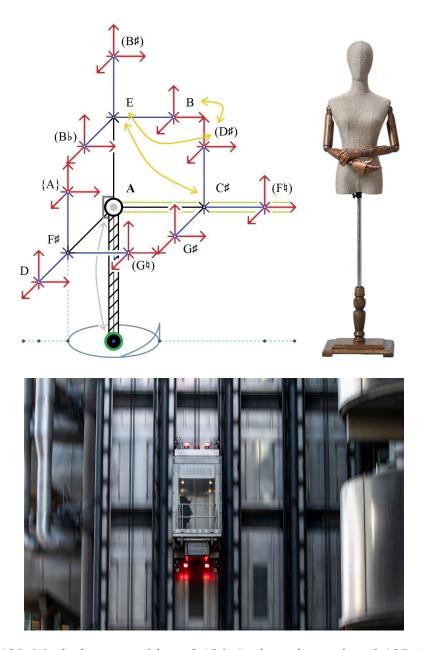
Figures: 2.182 Sculptural potency (Lorenzo Quinn, *Gravity Male*, date unknown); 2.183 Architectural basement

R. Adjustable calculation

Working with such intricacy, the musical model can be adjusted as a whole through transposition (Fig. 2.184) as keys ascend or descend structurally, or their tonoi shift in hypothetical space accordingly (2.185, gray and orange arrows). Concerning versatility for architecture, the building remains stationary while a mobile elevator accesses appropriate chambers (2.187). Sculpture can operate either way, similar to how a mannequin may be raised or lowered on a post, so as to be accessible to individual users (2.186).



Figure 2.184: Musical modulation



Figures: 2.185 Musical transposition; 2.186 Sculptural coupler; 2.187 Architectural elevator

S. Exchangeable synchronization

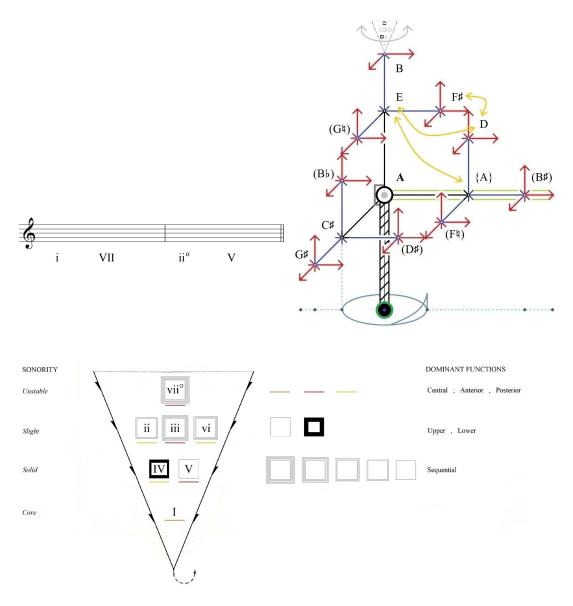
When studying its development, the flowering of tonal harmony can be, perhaps, considered the crowning achievement of Western music (Perry, Paper 78). If harmony is likewise defined as the cohesive expression of a dynamic system across the arts

(Sutcliffe, Part 1), music would uniquely construct a composition of notes that circulate around the tonic with weighted magnitudes (Fig. 2.189). Further defining this "solar" system's parameters (Cutler, 269), its sequence is largely characterized by fifths, mechanically built upon the aforementioned carousel of ascending or descending intervals [Component O]. Music then would impel its notes into chords, or simultaneous groupings that eventually serve as a background fabric (2.188) to a complementary melody [T]. While the manifestation of harmony and its myriad iterations across musical styles is naturally an extensive subject, Kostka and Payne have rendered a schematic which competently illustrates harmony's coordinated workings (104; 2.191). Based on downward gravity inherent to physical systems though, ¹⁰ I argue that a vertical diagram (2.190) more aptly demonstrates how major chords have a greater "solidity," or preponderance than minor chords across "orbital" levels, with diminished harmony being the most unstable during progression. The gyration of roots around a deeper tonic may be difficult to represent spatially, however, and if seeking to reset the dominant function after a tritone break (e.g., C major) B > E > A > D > G > C > F : B), this can be shown through a subdominant chord that recedes out of a theoretical conoid and then reconnects to the leading-tone as a mechanistic turning-point; declinations of the conoid can likewise be approximated by posterior (bearing penchant to the subdominant) and anterior (penchant to the dominant) triads, with degrees of shared notes around the central tonic (i.e., D - F - A : C : E - G - B [ii 7th C, IV 5th C, vi 3rd C; I root/tonic C; iii mediant E, V dominant G, vii° leading tone B {ii - IV - vi : I : iii - V - vii°}]). Sculpture provides a striking, if not dramatic example of the coherent expression of a dynamic system,

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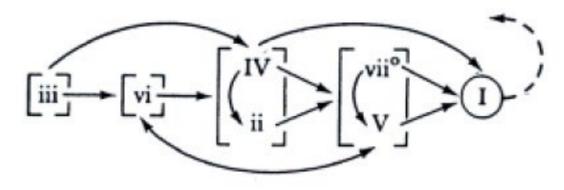
¹⁰ Schroeder, Daniel ("Mechanical Energy," Chp. 2. Honors 1500, Perspectives in the Physical Sciences,

particularly when seeing kinetic examples that are designed to move and mesh when driven by natural means (e.g., wind or gravity, etc.; 2.192). As occupants, human beings are free to circulate amid architectural constructions that tend to be fixed in versatility (2.193), however creative arrangements have been designed, where major components of a building can shift mechanically (2.194).



Figures: 2.188 Musically harmonic progression; 2.189 Turbinate engine; 2.190 Centripetal coordination

Weber University).









Figures: 2.191 Harmonic orbit; 2.192 Sculptural procession (Anthony Howe, *Octo*, 2013); 2.193 Architectural compartments; 2.194 Architectural series (Sharifi-ha House in Tehran, 2013)

T. Digital outlet

Advancing to the last of three parts concerning musical accompaniment, melody is routinely thought to be the most conspicuous (Fig. 2.196), yet its perceived separation from other contrapuntal layers is often enigmatic (2.197). If depending on the faculties of singular attention, melody would seem to rise to the surface of a sounding composition (Crespo-Bojorque, Celma-Miralles, and Toro, 951), and so our structural model extends a kind of conduit for to-be-performed notes (full extension, right duct in Figure 2.195). With the advantage of being the embodiment of a concept once again, sculpture shows how a train of articles can be a leading account of mannered expression (2.198). Though architectural structure might build some kind of physical projection, popularly this can be seen in bay windows or oriels from an outside view (2.199).

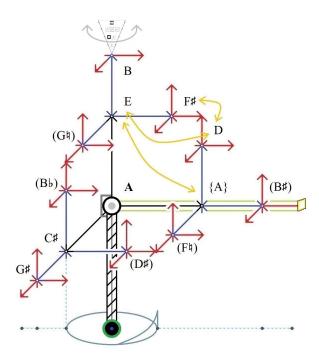
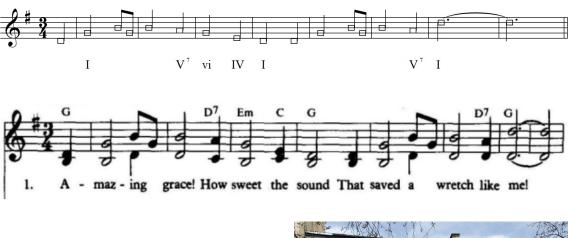


Figure 2.195: Focused pilot





Figures: 2.196 Musical melody; 2.197 Musical contra-melody ("Amazing Grace," hymn by John Newton); 2.198 Sculptural train (Nikhil Bhandari, *Sun Salutation*, 2011); 2.199 Architectural prominence as protuberant bays

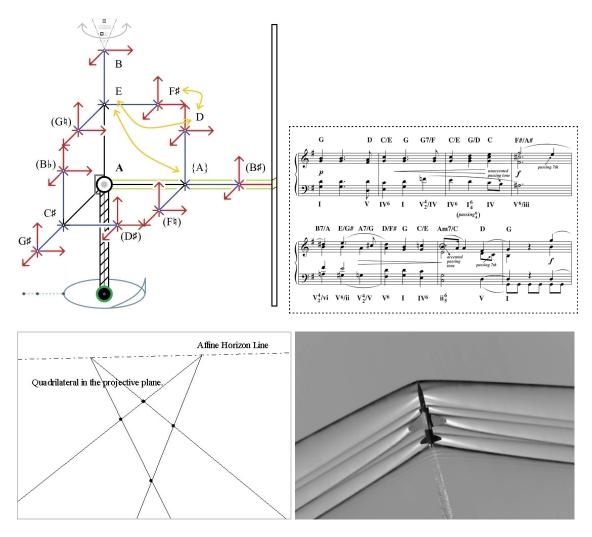
U. Tactical unification

Reaching a crucial stage, where theoretical construction meets practical reality, we turn to projective geometry as a means of correspondence between our three conjoined artistic subjects. As such, this concept maintains that linear perspective, or sight lines traverse through hypothetical planes and ultimately reach a horizon, where its ideal topology is comprised of complex numbers and points at infinity (Fig. 2.202). These

ideas are more concretely expressed concerning lattices¹¹ and commutative groupings in mathematics, for example, but when returning to music, the phenomenon of the sonic boom presents a possible explanation for the theoretical surface that covers the diaphanous art's mechanics. Here physical waves are compressed and released when an aircraft, for example, surpasses Mach 1, or the speed of sound and its associated barrier. Schlieren photography has recently been able to capture the moment when the sound barrier is breached and a shock wave is perceived by onlookers with its enormous amount of released energy (2.203). Further reinterpreting a musical score with harmonic notation (2.201) as a transparently frontal view of our structural model affixed to this putative plane (2.200; score chosen without harmonic correlation and such detail reserved for Chapter 3's analyses), sculpture apprehends a more physical manifestation of this imaginary border between worlds with commonly seen high (2.205) and sunken reliefs (2.204), while architecture substantively exhibits its own inside/outside versatility through popular translucent glass (2.206) or the celebrated Gothic flying buttress, 12 for example (2.207).

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¹¹ Tymoczko discusses this at length in "A Geometry of Music: Harmony and Counterpoint in the Extended Common Practice" (Chp. 3) and of note, his pitch lattices bearing resemblance to the complex array model. ¹² Ruddle, Austin ("Examining the Impact of Flying Buttresses and Other Innovative Strategies in High Gothic Cathedral Design" 2020, 24).



Figures: 2.200 Speculative diaphragm; 2.201 Musically notated accompaniment (excerpt from Tchaikovsky's "Morning Prayer" from *Album pour enfants* [Op. 39], analysis by Thomas, David Bennett); 2.202 Affine space; 2.203 Unifying horizon;









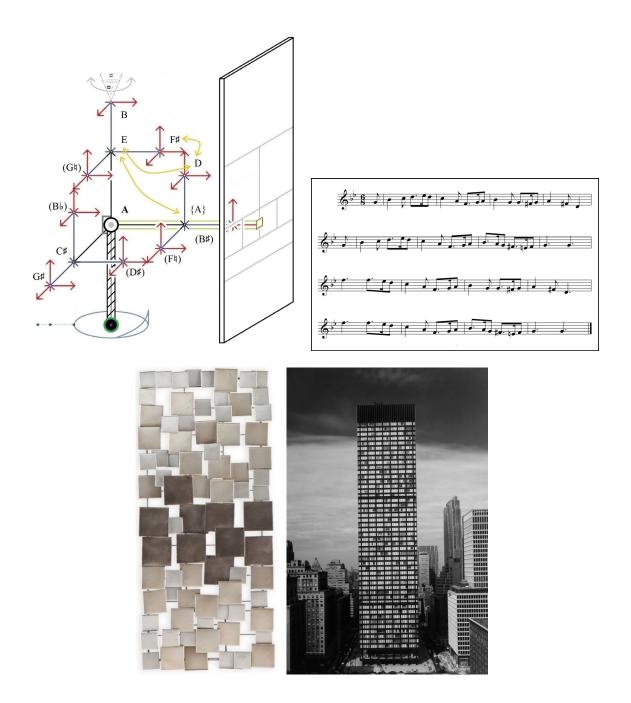
Figures: 2.204 Sculpturally sunken relief (*Cleopatra VII and Caesarion* at the Dendera Temple complex in Egypt, 54 B.C.); 2.205 Sculpturally high relief (Matteo Pugliese, *Extra Moenia—Il Dubbio*, 2011); 2.206 Architectural curtain wall (NAN Architects); 2.207 Architectural buttress reinforcement (Notre-Dame de Paris cathedral)

V.i. Modular organization i

Noting how *structure* has a wide array of meaning across multiple disciplines, ¹³ our terminology will make a distinction between inner and outer components, especially

¹³ The Oxford English Dictionary lists eight with two compound entries and seventeen main with eighteen sub-entry senses for structure, and it is among the earliest 13% of entries recorded in the O.E.D.

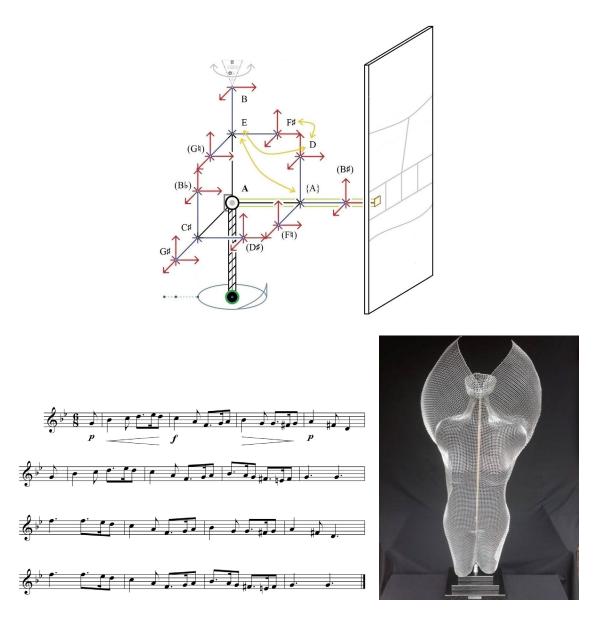
concerning more formally developed art. Thus historically, architecture evolved from load-bearing walls to a column-frame construction, where modern residential and commercial buildings commonly have an edifice that covers this weight-bearing frame. This grilled "wrapping" can be done in a more pragmatic manner for window positioning (Fig. 2.211), although vernacular and prehistoric buildings had to rely on thickened solid support, often at the expense of exposure to sunlight. Sculpture with cavities may be more closely aligned to earlier buildings that have one room since their formation is selfcontained, although artists can illustrate the concept of an exterior facade with an internally supportive structure quite creatively (2.210). Music is often organized in units, though it may be syntactically or sequentially. The latter is seen more frequently in popular styles, particularly when conjoined with lyrics as sections like the verse, bridge, and chorus tell a dramatic story in a song, for example. This kind of informal organization, perhaps, requires less familiarity with deeper structure (2.208) and because those surface units can be horizontally represented (2.209), it would have a closer affinity to a framed sculpture and its frontal mesh. The content of such a mesh and its resemblance to a Neo-Riemannian tonnetz is worth noting again, yet the theory's customary detachment from a working tonic is a critical distinction from my presented model of tonality, just as the latter's intervallic connections are key-centered, rather than triadic based.



Figures: 2.208 Framed contact; 2.209 Musical composition; 2.210 Sculptural tiling (Holly & Martin artisans, Wavson collection, Southern Enterprises Incorporated); 2.211 Architectural edifice (Union Carbide Building, New York)

V.ii. Modular organization ii

Expanding the spatiality of our construction (Fig. 2.212), its outward facade can assume more delineation, be it musically with crescendi or decrescendi (2.213), with sculptural skirting (2.214), or changing room dimensions (2.215) that affect its building facade (2.216).



Figures: 2.212 Surrounded contact; 2.213 Musical composition; 2.214 Sculptural tiling with mesh (Sławomir Golonko, *Lui*, 2018)

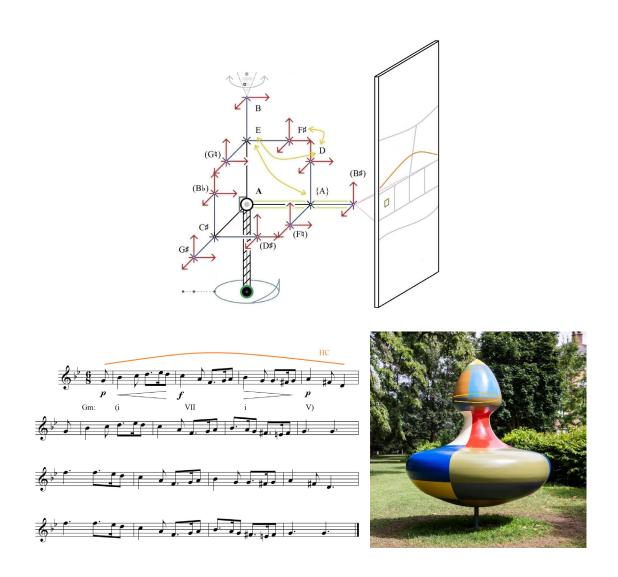


Figures: 2.215 Architectural configuration; 2.216 Architectural edifice (Parque Central Torre, Caracas, Venezuela)

W.i. Coordinated sequence i

Here we reach another significant moment, when coordinating structural function with regular timing. In music, phrases display a full harmonic statement within a given time signature, even if playing around the bars of a measure, especially in freely improvised genres styles. Thus in this example of the popular folk song, "Greensleeves," we see a half-cadence with dominant harmony in the key of G minor, with tonic, minor leading-tone and eventually dominant harmony over four measures (Fig. 2.218). As for our model and connected formal units, they become more visible in illustration (2.217) when viewing tonal structure from its margin, as opposed to the frontal score. Transferring music onto architecture from the principle of versatility and perspective of the observer, though realizing its impracticality, rooms within a melodic "floor" would circulate from a home-base (2.222), and from the perspective of a fixed observer (2.220). Some designs might permit easier insight regarding a rotary concept for inner structure

(2.221), and yet shifting the planar ranks of a room within a designated floor would be more accurate when representing harmonic voicing and counterpoint (2.223); e.g., the bass of V^6 is lower in register than the root of a I chord, with a common-tone of D between their 1st and 5th degrees of harmony, if written in the key of G minor. In sculpture, fragments can be arranged as a returning cycle, be it atop a solid mass or above a rotary formation (2.219).



Figures: 2.217 Episodic lapsing; 2.218 Musical phrase; 2.219 Sculptural fragmentation (Roger Clarke, *Kingston Spinning Sculpture*, Kingston, UK, circa 2021)







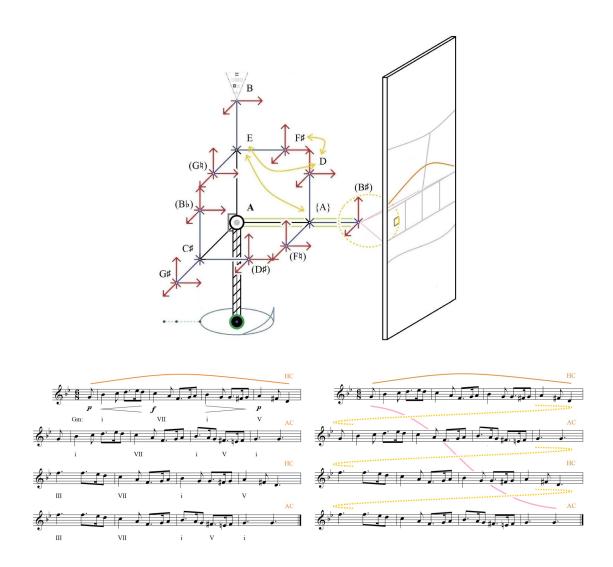


Figures: 2.220 Architectural course; 2.221 Idem routing (Spiral Window House, Alphavillle Design Firm, Osaka, Japan); 2.222 Idem circuit; 2.223 Idem tour (Emerald Art Glass House, Fisher ARCHitecture, Pittsburgh, PA)

W.ii. Coordinated sequence ii

As consecutive phrases are composed in music, we maintain the concept of periodicity, where material is renewed within the bounds of a listener's perception (Fig. 2.225). Formally this includes reiterated phrases that are "refreshed," if assuming periodic contact with some kind of deeper and vital source (2.224); on a larger scale, we can assume the same functionality when ending and starting a piece once again (2.226).

Though difficult to illustrate subtle changes during each architectural passing, especially from a peripheral view (2.228), a designer could rework the dimensions of a room (2.229) or shift entire ranks by mechanical engineering accordingly (2.230). In sculpture, fragments could be redone over each spinning revolution appropriately (2.227).



Figures: 2.224 Musical elapsing; 2.225 Idem reiteration; 2.226 Idem reprise



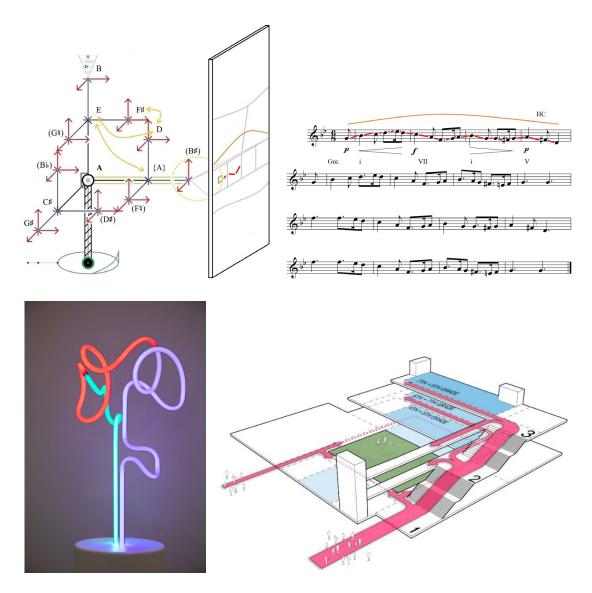




Figures: 2.227 Sculptural revolution; 2.228 Architectural returning, 2.229 Idem replication; 2.230 Idem revisitation

X. Procedural excursion

For occupants, navigating the floor-plan of a building can be done swiftly (Fig. 2.234) and yet when considering tonal harmony, it appears that notes conduct a sort of tracing between structural chambers (2.231) and its musical surface (2.232). Sculpture aptly shows continuity within a closed circuit, in this example as well (2.233).

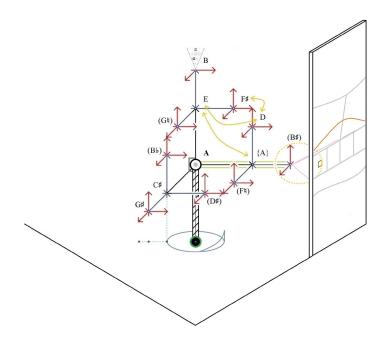


Figures: 2.231 Outfitted expedition; 2.232 Musical tracing; 2.233 Sculptural travel (Lisa Schulte, *Alfeo*, 2019); 2.234 Architectural navigation

Y. Geometric succession

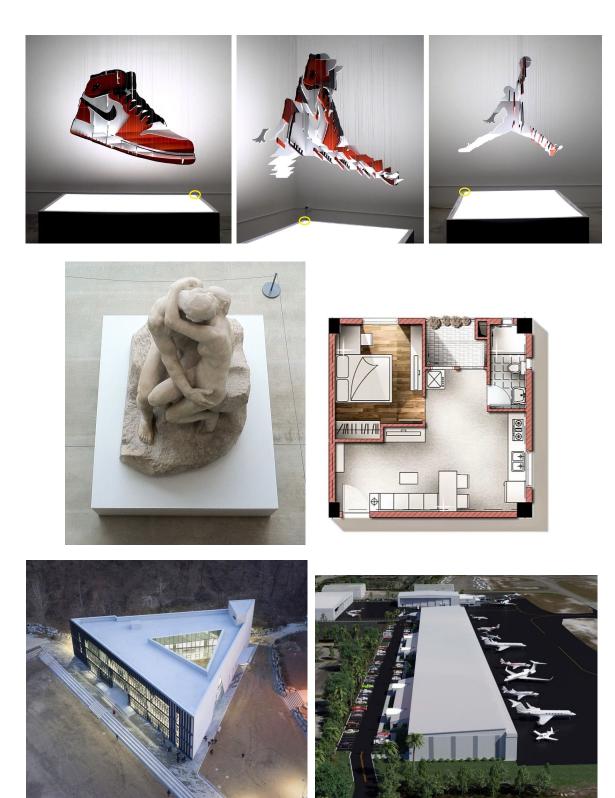
Just as movements are the largest division within formal music (Fig. 2.236) and coinciding traditionally with silent breaks during live performance, we can extend structural rotation to its outermost stratum within a compositional whole (2.235). It is similarly interesting that for sculpture, its vehicle might be more easily seen from a

higher viewpoint within a rectangular platform (2.238), though artists have imaginatively shown statuary from a different lateral perspective (2.237). For architecture, four corners are the most common design for buildings (2.239), owing in part to ease of measurement and practical use of space, plus stable weight distribution over 90°. Triangular design (2.240) might be more appropriate for support trusses used in bridges, beyond just two squared sides (2.241), although interesting to note how four musical movements have become the traditional mode of organization for the greater classical repertoire.



Typical Structure of a 4-movement Symphony and String Quartet			
	<u>Tempo</u>	<u>Form</u>	<u>Key</u>
Movement I	Fast	Sonata form	Tonic key
Movement II	Slow	Any form (as long as it's slow) Typically very lyrical	Different key
Movement III	Upbeat dance	ABA form (Ternary form or "minuet and trio" form) Minuets and Trios are both dances in 3/4 time (like a waltz) Minuet (A), then Trio (B), then repeat the Minuet (A)	Tonic Key
Movement IV	Fast	Sonata form or Rondo form	Tonic key

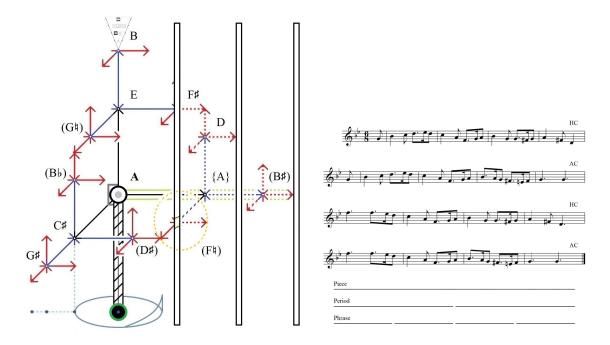
Figures: 2.235 Stationary rotation; 2.236 Musical movements



Figures: 2.237 Sculptural survey (Michael Murphy, *AIR*, circa 2019); 2.238 Sculptural review (Auguste Rodin, *The Kiss*, 1882); 2.239 Architectural corners (4); 2.240 Idem (3); 2.241 Architectural bends (2)

Z.i. Gradual compilation i

Simultaneously revisiting formal organization and focused scope, our exploration of a constructed model penetrates deeper through integral levels (Fig. 2.242); musically this might begin on a surface exterior when tabulating phrases (2.243), and then proceed into more profound operations. As occupants pass partitions and go deeper architecturally (2.245), we assume that walls are built within dwellings to prepare for different functions (e.g., a bedroom for sleeping or a bathroom for private washing, etc; 2.246). Retreating from their exterior surface, some paper sculptures deftly illustrate how artists can give us insight into a deeper space, and more illuminating "world" (2.244).



Figures: 2.242 Transportable assimilation (lateral view); 2.243 Musical section (outward view)







Figures: 2.244 Sculptural mantle (Daniel A. du Preez, *Reminiscence*, 2018); 2.245 Architectural walls (100 Wall Church in Cebu City, Philippines); 2.246 Architectural encasing

Z.ii. Gradual compilation ii

For many scholars, Heinrich Schenker made a major contribution to music theory. As author, I am pleased to recognize how his structural ideas have influenced my concepts between musical composition and architectural construction. To briefly explain, Schenkerian analysis argues that a piece of tonal music can be reduced to its *Ursatz*, or fundamental structure, when exercising diminution and dismantling *Auskomponierung*, or material that has been prolonged across "Foreground (Fig. 2.248), Middleground (2.249) and Background" levels of organization. These *Schichten* can be likened to modular

partitions (2.247) and architecturally to walls, which divide rooms that may be surrounding a larger or more central chamber (2.251). Seen more frequently, cloisters include open arcades that run along the walls of a building, especially that a cathedral or church (2.252). These cloisters were historically associated with monastic orders, where members likewise secluded themselves from secular life and became more dedicated to spiritual devotion. Dioramas also have an intriguing display, where sculptural figures are situated on modified planes within a particular scene (2.250). In their earlier history, as designed by Daguerre and Bouton, a partition could be painted on both sides and when illuminated, different events were portrayed, often telling stories in dramatic sequences accordingly.

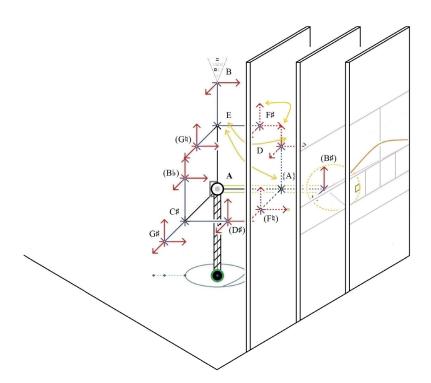
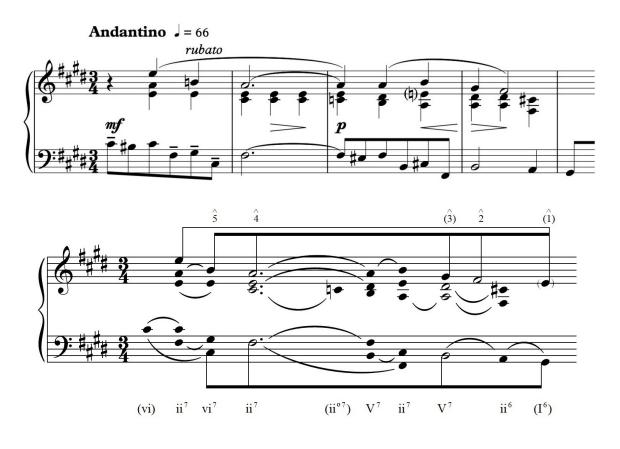
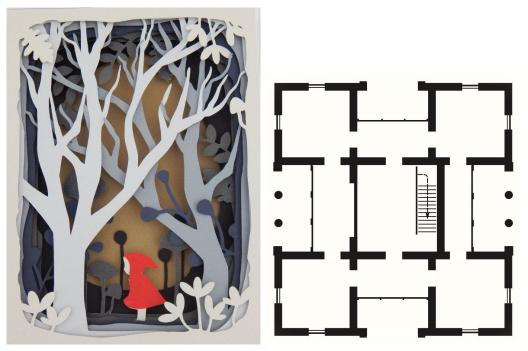


Figure 2.247: Transportational assimilation (oblique view)





Figures: 2.248 Musical *Schichten* (Alexander Scriabin, 24 Preludes, Op. 11, No. 9; A); 2.249 Idem (B); 2.250 Sculptural diorama (Décor Asylum artisans, *Little Red Riding Hood*, circa 2019); 2.251 Architectural compound



Figure 2.252: Architectural cloister

Z.iii. Gradual compilation iii

While "Greensleeves" was originally registered as a broadside ballad to the London Stationer's Company by Richard Jones in 1580, other versions have appeared as a *romanesca*, which most often is comprised of poetic couplets repeated over a simple bass that provides the groundwork for musical improvisation (Gerbino, *Grove Music Online*). Analytically, a pattern of quarter-eighth-dotted eighth-sixteenth-eighth notes comprises the work's rhythmic motive and if grouping its repetitions based on similarity, we've utilized syntax, or grouping smaller into larger units (Fig. 2.253), and then elevated the assortment into a phrase. Syntactic theory is closely associated with linguistics and some scholars have attempted to link neural processes to a musical interpretation (Patel, 674), however our methodology is demarcated by harmonic cadence, and thus the piece has four phrases grouped into two periods (Fig. 2.243). Not all pieces are as uniformly organized, though, just as "Clementine" has an irregular syntax of both different phrase lengths and grouping number (3), relative to periods (2; Fig. 2.254 by convention: repeating notes crossed, non-harmonic notes parenthesized,

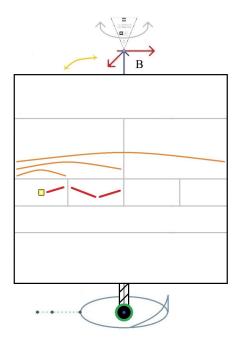
Urlinie [fundamental line] as ascending notes encircled green and descending notes encircled violet, deeper level notes circled twice and deepest three times). According to apocryphal sources, ¹⁴ Michelangelo said that "Every block of stone has a statue inside it, and it is the task of the sculptor to discover it." Scholars have subsequently claimed that the artist used terracotta or wax to model his figures, next he would paint this outline on a stone block, for example, and then he would carve the expressive form into existence by subtracting excess material (Goldscheider, 9). Other techniques were available for sculptors in the Italian Renaissance, including submerging the model in water and to gauge its proportions at a specific level, but Michelangelo was reputed to have a photographic memory, 15 and the aforementioned approach remains among the most widespread methods today (2.255). In contemporary architecture, one economic approach to finishing the building includes unitized curtain systems, where large glass units are created within a factory and then sent to the construction site. Once on site, the units can then be hoisted onto anchors and then connected to the building. 16 Otherwise, stick-built systems insert long pieces of aluminum between floors to support and transfer the load of the glass back to the structure (2.256).

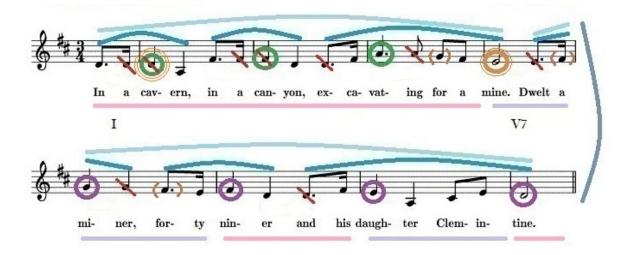
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¹⁴ Enduring as apparent elaboration, the source of this quotation most likely dates back to a debate among Florentine connoisseurs, arguing whether sculpture or painting held sway as the supreme art of the age. In a letter of response to the discussion when sent to Benedetto Varchi, a humanist writer, historian and poet, Michelangelo declared "The sculptor arrives at his end by taking away what is superfluous; the painter produces his by adding materials, which embody representation to the mind" (Linscott, 283).

¹⁵ Michelangelo Models 2021, "How Michelangelo Created His Paintings."

¹⁶ W&W Glass, LLC 2022, "Should I Use a Unitized Curtain Wall or Stick-Built System?"

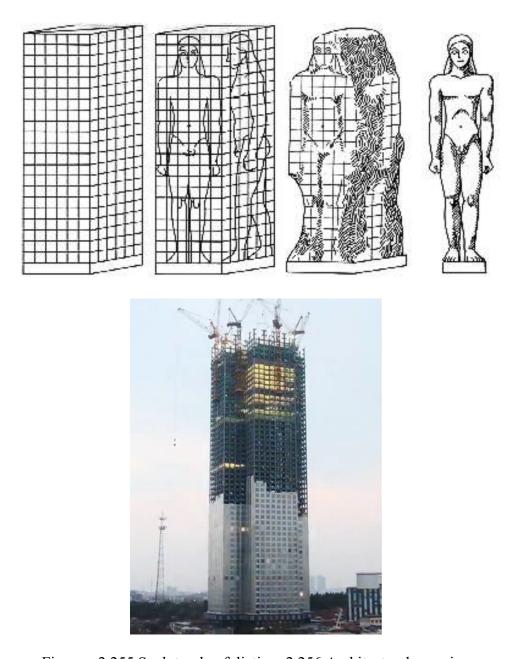




Figures: 2.253 Transportational assimilation (anterior view); 2.254 Syntactical units and *Ausfaltung*, ¹⁷ or musical unfolding

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¹⁷ Heinrich Schenker 1935 (*Free Composition*, Appendix 5, List of Terms).

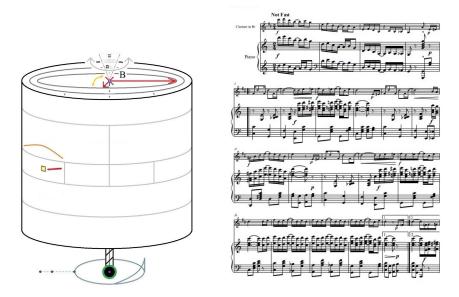


Figures: 2.255 Sculptural exfoliation; 2.256 Architectural encasing

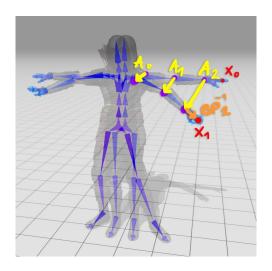
A.2. Multifaceted prototype

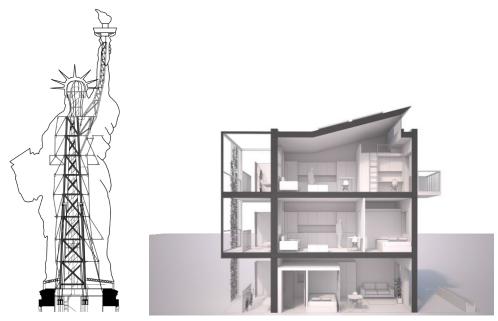
To complete this portion of Chapter 3, we'll survey each artistic subject as integral wholes. Thus while consensus is not universally agreed, for our purposes we'll accept the definition of tonality as being a system of notes that are organized around a

central point, or tonic (*Grove Music Online*). If elevating this description to a dynamic model, I would like to call its musical system the complex array, assuming that its internal structure (Fig. 2.258) is conjoined with outward organizational form (2.257). Sculpture might integrate the armature as a means of support for its surrounding form (2.260), just as skeletal rigging might be poised with computer sensors and to simulate a character's animation within a popular video game, for example (2.259). Cross-sectioning is typically used under technical architectural drawing, so as to assist a contractor on how a building is constructed, although axonometric projections can further represent three-dimensional objects and show a relationship between multiple aspects of a design's engineering (2.261).



Figures: 2.257 Musical model; 2.258 Musical barring (*The Entertainer* by Scott Joplin, arranged for piano and clarinet by Fabrizio Ferrari)





Figures: 2.259 Sculptural modeling; 2.260 Sculptural anatomy (Frédéric Auguste Bartholdi, *Statue of Liberty*, 1886); 2.261 Architectural cross-sectioning

B.2. Actionable organon

Having established a model by which to conduct operations (Fig. 2.262), we arrive at our last stylistic factor and its means of manipulation. In sculpture, manual tools such as a chisel are traditionally used (2.267), although more sophisticated means can be applied, including pneumatic hammers or electrically powered cutting blades. Modern

architecture relies on industrial equipment for heavy-duty tasks in construction, such as raising steel beams with a mechanical crane (2.268) or bulldozers clearing the earth's foundation, whereas draft animals were oft employed for grading the earth, during agrarian eras, for example. Interestingly as we approach acoustic instruments and because music is an abstracted art, its manifestation would still seem dependent upon enacting performers (2.266). Thus when playing the piano, for example (2.265), the instrument seems to function as an intimate appendage of the musical subject itself, as if it were a suppositional organ¹⁸ and connected to the artwork at registered points (2.263). Electric instrumentation may utilize voltage for increased energetic performance, while the function of maneuvering the sounding art by some kind of technique (for example by keyboard) remains the same (2.264), including synthetic software.

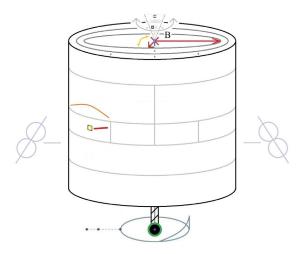
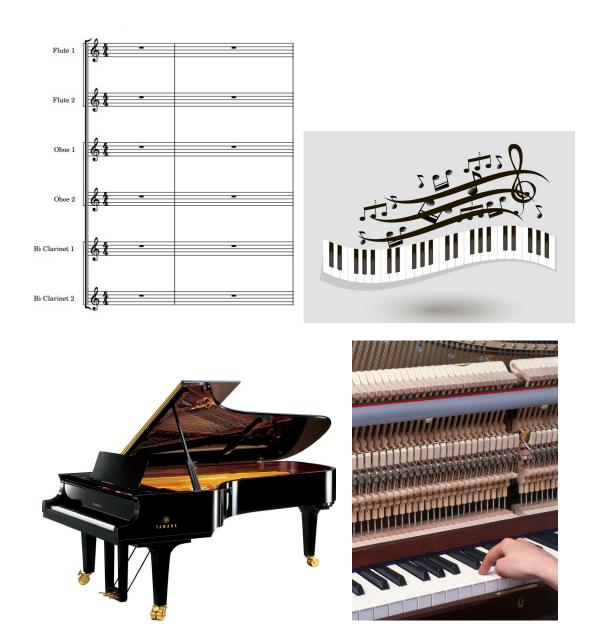


Figure 2.262: Enclosed musical model

¹⁸ It's of interest to note how *organ* has additional meaning under autochthonic theory, where biology defines "a natural part or structure in an animal or a plant, capable of performing some special action that is essential to the life or well-being of the whole" and how music describes "a wind instrument containing numerous pipes of various dimensions and kinds, which are filled with wind from a bellows, and played upon by means of keys similar to those of a piano, and sometimes by foot keys or pedals; each pipe being considered an organ" (Webster's Dictionary Online).



Figures: 2.263 Assigned orchestration; 2.264 Sonic notes performed 2.265 Instrumental medium; 2.266 Keyboard performance



Figures: 2.267 Sculptural implement; 2.268 Architectural power-tools

3. ANALYTIC SAMPLE

When considering the significance of two artistic works, it is important to recognize their authorship in relation to the cultivated factors, elements and aspects behind each piece.

3.1 Career Biography

Respecting the personal and professional lives of each artistic figure, let us appreciate those details which augment our understanding of the musical and architectural works in question.

3.1.1 Artistic Musician

3.1.1.1 Ludwig van Beethoven

Ludwig van Beethoven (1770-1827) was a German composer and pianist, whose work served as a transition from the Classic into Romantic eras of Western music. His career has been academically divided into three periods (*Grove Music Online*): the early period formed his apprentice years of composition until 1802; his middle period, between 1802-1812, demonstrated his ingenuity concerning formal models and compositional vehicles; and during the late period until his death, his musical innovations became even more striking and revolutionary. As a child, Beethoven had endured a dysfunctional home-life and into his twenties had suffered emotional distress from encroaching deafness. As his condition declined, he became less socially involved, while the noted intensity of his fiery personal disposition had conceivably made its way into his dramatic

music.¹ Compositionally, Beethoven is most known for his symphonies, piano sonatas and concertos, and string quartets, and he remains one of the most admired composers in the history of Western music, as his works remain among those most performed of the classical music repertoire (Figure 3.1).

3.1.2 Applied Architect

3.1.2.1 William Van Alen

Born in Brooklyn, New York, William Van Alen attended the Pratt Institute, while working for the architect Clarence True. After finishing his studies at the Atelier Masqueray, Van Alen worked for the Clinton & Russell firm in New York, before receiving the Paris Prize scholarship in 1908. By 1910, Van Alen had become interested in modernism and in 1911, he formed a partnership with H. Craig Severance. Their business initially was successful, though owing to different personal styles, their relationship grew more strained and the partnership eventually dissolved in 1924. Van Alen continued to practice in New York with smaller commissions, including several innovative designs from Childs Restaurants at 604 Fifth Avenue in Midtown Manhattan as completed in 1925, but Severance and Van Alen later found themselves engaged in a rivalry when designing buildings that were to become the tallest in the world: Severance,

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¹ Although Anton Schindler, Beethoven's personal secretary and musical confidant, had reputedly coined the title, the "Tempest" in response to Op. 31, No. 2's innovative harmonic composition, the composer's encroaching deafness reached a critical stage and he retreated to Heilegenstadt in 1802, where he wrote "Such experiences have brought to me close to despair, and I came near to ending my own life—only my art held me back, as it seemed impossible to leave this world until I have produced everything I feel it has been granted to me to achieve" (Schmidt-Görg and Schmidt, p. 21). This famous testament is contemporaneous with the writing of Sonata No. 17 in D and though without a direct reference, Beethoven declares that "Usually I have to wait for other people to tell me when I have new ideas, because I never know this myself. But this time—I myself can assure you that in both these works the manner is quite new for me" (Cooper, 124) and we can assume some psychological and physiological strain when forging original art.

the Manhattan Trust Building 40 Wall Street; Van Alen, the Chrysler Building. Although Van Alen's building won, both were surpassed in height by the Empire State Building in 1931. Van Alen's career declined after a contract dispute with Walter Chrysler when requesting a 6 percent payment of the building's construction budget, a fee that was a standard of the time. Van Alen sued and won after Chrysler refused payment, however with the onset of the Great Depression, Van Alen thereafter taught sculpture at Beaux-Arts Institute of Design. In addition to this legacy, Van Alen lent his name to the Van Alen Institute, a New York City-based nonprofit organization which fosters public and private investments² and is dedicated to improving design in the public realm through exhibitions and competitions, and community advocacy and engagement³ (Fig. 3.2).



Figures: 3.1 Ludwig van Beethoven (portrait by Ferdinand Georg Waldmüller, 1823); 3.2 William Van Alen (portrait by Henry R. Rittenberg, 1945)

² Van Alen Institute 2023, "About."

³ Cause IQ 2023, "Van Alen Institute Projects in Public Architecture."

3.2 Authorial Title

3.2.1 Symphony No. 9 in D minor, Op. 125 (1824)

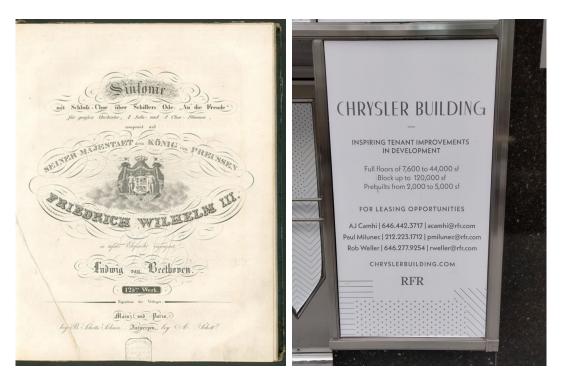
Though popularly known as the "Choral" Symphony (and in Beethoven's original manuscript as a "Grand Symphony written for the Philharmonic Society of London," owing to its 1817 commission), the Ninth symphony does not have a programmatic title from the composer, unlike his third ("Eroica") and sixth ("Pastoral") symphonies. Beethoven had detailed in his personal correspondence that he planned for the 9th Symphony to be entirely instrumental and the "Ode to Joy" to be a separate cantata, although his Choral Fantasy, Op. 80 from 1808, bears resemblance to a piano concerto with vocal soloists and mixed chorus. Beethoven hoped to premiere the work in Berlin as a response to popular Italian composers, but a petition was signed by prominent music patrons and performers, and this persuaded Beethoven to commit to the performance in Vienna. Held in the Theater am Kärntnertor in Vienna, alongside the overture to the Consecration of the House and three parts of the Missa Solemnis, an enthusiastic audience received the piece with Beethoven in attendance on May 7, 1824. Two years after the work's premiere, the first German edition was printed by B. Schott's Söhne (Mainz) in 1826 and it included the subtitle, "with Final Chorus on Schiller's 'Ode to Joy" (Fig. 3.3). The Breitkopf & Härtel edition dating from 1864, has since been used widely by orchestras for performance. In 1997, Bärenreiter published an edition by Jonathan Del Mar, which ostensibly corrects nearly 3,000 mistakes in the Breitkopf edition, some changes of which were described by Zander as "remarkable" (prg. 50). David Levy, however, criticized this edition, saying that it could create "quite possibly false" (p. 225) traditions. Critically, the symphony is regarded today by many as

Beethoven's greatest work and one of the supreme achievements in the history of western music. Despite other professional detractors, Symphony No. 9 is one of the best-known works of orchestral music, and one of the most performed symphonies in the world.

3.2.2 The Chrysler Building (1929)

Beginning as a real estate project by William H. Reynolds, the former New York State Senator set out to build the world's tallest building in his name during a 1920s economic boom in consumer technology and mechanical industry. After several years of delays, Reynolds hired the architect William Van Alen to build a forty-story building at the intersection of 42nd Street and Lexington Avenue in midtown Manhattan, although designs were revised several times so as to augment the structure's height. Frustrated by lawsuits during his political career, Reynolds later sold the plot, lease and plans to Walter Chrysler, who envisioned the building to serve as the Chrysler corporation's headquarters. Chrysler assisted in several points of design, although the building's construction was energized by a competition with 40 Wall Street as designed by Van Alen's former business partner, H. Craig Severance, to become the tallest building in the world. Ultimately Van Alen triumphed by secretly constructing a spire inside the frame of his building, which was then assembled and mounted on top of the dome, just one day before the devastating Wall Street Crash of 1929. The Chrysler Building was the first man-made structure to be taller than 1,000 feet (300 m) and is still the world's tallest steel-supported brick building, however the Empire State Building soon surpassed both structures, despite a low-level percentage of occupancy. Critically, there have been sharp

reviews of the building's design since the Chrysler Building opened,⁴ yet it's now seen as a paragon of the Art Deco style and in 2007, it was ranked ninth on the List of America's Favorite Architecture by the American Institute of Architects⁵ (Figs. 3.4-3.5).



Figures: 3.3 Cover of first-edition score for Symphony No. 9 (Mainz and Paris: Schott, 1826); 3.4 Outdoor leasing advertisement publicized by RFR realty (circa 2021)

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⁴ George S. Chappell (under the pseudonym T-Square) of the *New Yorker* (67) derided the tower as "distinctly a stunt design, evolved to make the man in the street look up. To our mind, however, it has no significance as serious design: and even if it is merely advertising architecture, we regret that Mr. Van Alen did not arrange a more subtle and gracious accommodation for his Pelion-on-Ossa parabolic curves." Lewis Mumford, a succeeding contributor at the *New Yorker*, was not as severe, but less than enthusiastic: "Heaven help the person who looks at this building without the help of distance and heavy mists" (Gilmartin, Mellins, and Stern, 609).

⁵ As a further indication of popularity, the American Institute of Architects included the building as part of its "America's Favorite Architecture" 2007 list (Vol. 14); likewise in 2001, Beethoven's autograph manuscript became the first score added to the United Nations Memory of the World Programme.



Figure 3.5: A directory board within the Chrysler Building's lobby

3.3 Established Genres

3.3.1 Symphony

The symphony has a fascinating history and its etymological origins can be traced back to ancient Greece (Online Etymology Dictionary), however the term's most common usage today denotes a multi-movement composition that is to be performed by an acoustic orchestra. The music's earliest iteration began with vocal works, as led by composers such as Giovanni Gabrieli (*Sacrae Symphoniae*, I and II) during the sixteenth and seventieth century, but once sonata from was introduced as a technical model by musicians such as Franz Joseph Haydn (Symphony No. 22 in Eb major, Hoboken I/22, 1764), Beethoven himself became a key figure in the symphony's classic, and more mature development. The genre's evolution culminated during the Romantic era with massive orchestral forces in the music of composers like Gustave Mahler (Symphony No. 8 in Eb major, 1906), however its popularity has since been eclipsed by works and other styles with mixed ensembles, including both electric instruments and electronic

programming. Nevertheless, the symphony has remained a standard medium for contemporary composers⁶ and the genre's reputation as a benchmark achievement of Western music continues to endure.

3.3.2 Skyscraper

The skyscraper is a modern phenomenon, whose historical development is arguably still being written. The earliest examples of continuously inhabitable buildings above 100 feet can be attributed to advances in steel supporting frameworks (the Home Insurance Building in Chicago, 1885), although there is no current agreement on a standardized definition of height. Recent innovations have erected a tubular structure with designed setbacks for even greater heights, and this is most often utilized for highrise buildings to host residential spaces, offices, hotels and/or retail space (e.g., Willis Tower in Chicago, 1974). Other amenities such as passenger elevators and curtain walls have become common-place, so as to make accommodations more hospitable. Ancient and medieval structures, including the Great Pyramid of Giza at 479 feet (26th century B.C.) and the Lincoln Cathedral at 520 feet (before its central spire collapsed in 1548) had surpassed 100 feet before, as well as the 555-foot Washington Monument in 1884, however being uninhabited, none of these structures comply with the modern conception of a skyscraper. Other high-rise apartment buildings, or insulae in ancient Rome and high-rise towers in medieval cities had been constructed, yet none from antiquity have survived, and succeeding towers in Florence were regulated to lower heights, for example. Continuing advances in technology have created new categories for "super-tall"

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⁶ As demonstrated by Abrams-Russo's study of six major American orchestras since 2018, annual programming of contemporary music has averaged from approximately 27% and has increased to 47% in

skyscrapers above 300 metres, or 984 feet (e.g., Petronas Towers in Kuala Lumpur, 1998) and "mega-tall" above 600 m/1,969 ft (e.g., Burj Khalifa in Dubai, 2010),⁷ just as visionary complexes such as X-Seed 4000 in Tokyo (4 km in height and 6 km wide on a sea base for 1,000,000 inhabitants; status undetermined) evolve beyond current building types into "vertical cities."

2022

⁷ Having developed international standards and associated categories, the Council on Tall Buildings and Urban Habitat's *Tall Building Criteria* (2023) includes Proportion, Height-Relative-to-Context, and Construction phase status, for example.

⁸ Gimazutdinova and Novikov 2021, "Vertical Cities: Reality or Utopia of the Future?"

3.4 Spectral Extraction

3.4.1 Preparatory Application

Having introduced a theoretical premise, let us now methodically examine relevant content regarding Symphony No. 9 and the Chrysler Building, while free of sculpture functioning as a mediator between musical and architectural subjects.

3.4.1.1.1 Corporate Article

Since establishing the musical note and architectural occupant as artistically comparable, historical archive and public record respectively provides some compelling samples for analysis:

In 2001, UNESCO committed the original score of Beethoven's Ninth Symphony to the Memory of the World register, where it is preserved in the Berlin State Library as a testimony to the intellectual contributions of mankind. In this autograph of the first Recitativo from the fourth movement, the inscribed note is an E in bass clef and sung by a bass soloist, with the first instance of text ("O Freun-de") included in the manuscript (Figure 3.6).

During 2019 and as made publicly available at Metro Manhattan Office Space,¹ the seventy-two floors of the Chrysler Building were mostly leased, preceding the loss of small business tenants in the basement arcade during the 2019-2020 Covid pandemic. The skyscraper, however, is home to various companies operating in the legal sector, financial services, media and communications, as well as medical office tenants and coworking spaces. One notable tenant is Dr. Charles M. Weiss, a dentist on the 69th floor, and whose office enjoys a view of lower Manhattan through windows of the

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¹ Metro Manhattan Office Space, "The Chrysler Building office space."

architectural crown. Here a patient poses for a picture on his family's Flickr account circa 2012 (Figure 3.7).



Figures 3.6, 3.7

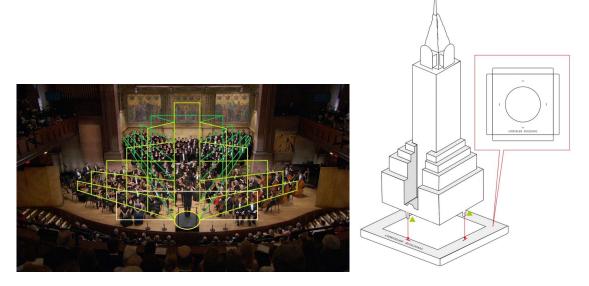
3.4.1.1 Perceptive Manifestation

1. Agency

Just as our theoretical premises have established a model, our analytic sample apprehends greater meaning through specific aspects. Whereas the former presented the Danish String Quartet performing within a traditional semi-circle seating arrangement, the 9th Symphony calls upon a conductor, who's leading an enlarged standard orchestra with four vocal soloists and an SATB choir. In this 2016 image of the Vienna Chamber Orchestra and Westminster Symphonic Choir performing at Princeton University's Alexander Hall, we find conductor Mark Laycock being central, the four soloists facing laterally up front, the orchestra winged immediately behind, and the chorus amassed in the back rostra. Though a myriad of seating arrangements is possible, it's often most practical to separate families of instruments in distinct rows, and this forms the basis for projecting directed intentions. Thus as the forces of the ensembles are situated, the

conductor forms the central "column," even as the soloists are facing forward and aligned horizontally across the front of the stage. We then construct the mantle, or display upon which the contents of music will eventually be cast. Each queue of performers constitutes an edificial tier (e.g., light and dark green and peach colored lines), while its vertical dimension is erected as the product of successive tiers, in this case balancing an idealized proportion symmetrically. While noticing that this construction does not enclose a complete form, versatility in music permits a continually pivoting encompassment, relative to the viewpoint of the observer (3.8).

Courtesy of Fascinations Incorporated, their Metal Earth 3D model kit (4) gives us an excellent representation of the Chrysler Building and how a skyscraper, in this example, is the agent, or membership of architecture which exercises artistic life. Though not dependent on human projection, as is music, the assembled model can still be constructed around a central point, theoretically projecting outward here from its central focus (3.9).



Figures 3.8, 3.9

2. Substance

Comparing music's ethereal substance, where the Danish String Quartet performed at the Daniel and Joanna S. Rose Studio in New York's Lincoln Center in 2014, we see that sonic material has changed little under Gustavo Dudamel's baton, as advertised for a concert where the conductor is in residence at the Los Angeles Philharmonic. The actual composition being performed in the photograph is unknown, even though the scheduled June 2021 program included Beethoven's "Leonore" Overture No. 3 and his Symphony No. 7, yet we can still assume that the chemical composition of the air in Walt Disney Concert Hall would not have changed significantly (3.10).

While atmospheric substance might be rather commonplace from one concert venue to another, the Chrysler Building has several notable attributes concerning its materials. Included among these are a steel structure, comprising 20,000 tons of Bethlehem H-beams that were forged by the Carnegie Steel Company (3.12). The Chrysler was one of the first skyscrapers using stainless steel, an austenitic alloy called "Nirosta," which is a German acronym for nichtrostender Stahl, or "non-rusting steel," and developed in Germany by Krupp AG. Composed of higher 18% chromium and 8% nickel grades, the alloy is used for exterior ornaments, the window frames, crown, and the tower's needle. The shaft of the tower has four sides that are framed by bricks and a pillar of marble that rises along the entirety of each side. With a total of 3,826,000 that are used in different patterns on other floors across the greater facade, the Chrysler is the tallest brick building in the world with a steel framework at 1,046 feet (319 m; 3.11). Of note regarding the interior, the elevator cabinets were uniquely decorated with different inlays of exotic wood, including English gray hardwood, Oriental walnut, and Cuban

plum pudding (a type of mahogany). The interior panels consisted of 1/8" thick veneers laid in geometric patterns, and this was designed by Van Alen with the assistance of L. T. M. Ralston, who was in charge of developing the elevator cabs' mechanical parts (3.13).



Figures 3.10, 3.11, 3.12, 3.13

3. Station

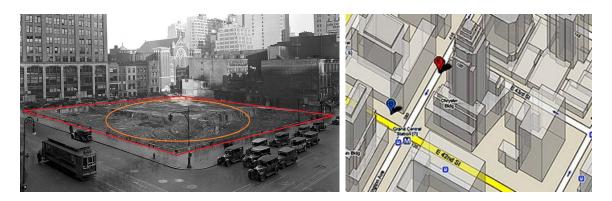
Again comparing the Danish String Quartet when performing the traditional Swedish song, *Nu Blomstertiden Kommer*, we have seen that its musical cynosure is concentric, just as for the Simón Bolívar Symphony Orchestra of Venezuela, it is

eccentric when performing at the Grand Hall (Großer Saal) in Berlin (3.14). This would seem to corroborate the theory that versatility in music permits a rotating encompassment, relative to the viewpoint of the shifting observer; either amidst the ensemble of a string quartet, or upon the conductor of a large orchestra. It is of interest to note that the orchestra is standing during the audience's applause and musical conformation could not actually occur, but in the photograph of the orchestra performing in Simón Bolívar Concert Hall, conceptual projection occurs thereafter (3.15).

As is common to urban planning and in the case of Manhattan real estate, the city-block provides a practical way to demarcate private property. The Chrysler is situated between East 42nd and 43rd Streets and Lexington and 3rd Avenues, however the building is a bit unusual by having a trapezoidal footprint. This is because southeast frontage on the site originally bordered the Boston Post Road, which preceded a street grid as imposed by the Manhattan Commissioners' Plan of 1811. While the road is still visible in a photograph when clearing the foundation in 1928 (3.16), the title of the roadbeds was transferred to buyers over time by the city, and the remaining half of the block is home to a conglomerate building complex today (3.17).



Figures 3.14, 3.15



Figures 3.16, 3.17

4. Motility

Lastly, as the Danish String Quartet performed live for the Chamber Music Society of Lincoln Center, the Simón Bolívar Symphony Orchestra with the Coral Nacional Simón Bolívar's performance in Venezuela would actuate the same kind of motility, that being oscillation of the musical subject. Simón Bolívar Concert Hall, where the Beethoven concert was held in 2017, however, has variable configurations amid reflective ceiling and wall panels, and a manually adjustable reverberation chamber, so as to affect the finer acoustics of the sonic experience (3.18).

Weighing approximately 223,000,000 tons and set amid three strata of metamorphic bedrock in Manhattan, the Chrysler is a remarkably stable building, yet being a stellar example of modern architecture, it is equipped with movable amenities such as 32 elevators, sliding windows among an exterior total of 3,862, and three public entrances with revolving and hinged doors, among a plurality of functionally moving engineered parts (3.19).





Figures 3.18, 3.19

3.4.2 General Application

Regarding time in this facsimile reproduction of the Ninth Symphony, AP Manuscripts hand-sew their bindings for resilient stiffness, as the hard-cover and bookblock are fastened together with leather straps. Since its 67-pound paper is pre-creased for flexibility, page-turning can be done with ease, even if Beethoven's score is treated here as a decorative display (Fig. 3.20); standard paper weight is up to 80 lbs otherwise for instrumental parts regarding many orchestras, when used during performance (Puff 2012, prg. 4).

Taken during what is uniquely called "Manhattanhenge," Figure 3.21 shows the setting sun over 42nd Street in New York, with an eastward view of the Chrysler Building. This phenomenon occurs during astronomic solstices, where the sun's azimuth aligns with the rectilinear street grid of Manhattan that is positioned 29° clockwise from true east-west. Manhattan is a particularly remarkable place to experience the occurrence

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² Neil deGrasse Tyson, astrophysicist and director of the Hayden Planetarium in New York, is accredited with popularizing the term, after discussing his inspiration from Stonehenge and other prehistoric history in a published video ("Neil deGrasse Tyson on Manhattanhenge", *YouTube*).

during summer months, owing to the city's extensive urban "canyons" and its increased popularity for both residents and visitors, who position themselves on bridges or briefly in roadways for a look or capture on social media. Otherwise during winter (3.22), "reverse" Manhattanhenge doesn't get as much attention, partly because fewer people are outdoors during colder months and fewer people are awake during the sunrise.





Figures 3.20, 3.21, 3.22

³ Defined as "the walls and ground (usually street) between adjacent buildings; [canyon air volume] the air contained within this structure" (Nunez and Oke, "The Energy Balance of an Urban Canyon").

3.4.2.1.1 Experiential Versatility

We have seen how versatility assumes a critical role when perceiving music and architecture, and yet for Symphony No. 9 and the Chrysler Building, our analysis yields more subtle variations. To facilitate such examination, the following samples are consistent as possible when isolating each Spectral term.

While conducted by Gustavo Dudamel in this photographed performance with the Simón Bolívar Symphony Orchestra of Venezuela, Cor de Cambra del Palau de la Música and Orfeó Català, the audience follows the convention of remaining seated as the music dramatically "passes" by (3.23). This rotating model of sound remains unaffected, even if an audience member were to sit in the upper loft behind the performing ensemble, though an intriguing topic would be to consider how the piece itself might be mobile across spatial positions, regarding future research.

Pedestrians around the Chrysler arguably have limited options to view the skyscraper, since sidewalks in Manhattan average 12 feet wide (NYC Business, City of New York 2023) and three of the walkways around the Building are in immediate proximity to adjoining roadways⁴ (3.25). The southwest facade is buttressed against other properties within the Chrysler Center complex, including Chrysler Building East at 432 feet, although the Chrysler Trylons at three stories high were designed by Philip Johnson, so as to "give you the top of the Chrysler Building at street level" (Dunlap, prg. 4). Otherwise in 2017, New York City Council rezoned 43rd Street between Lexington and Third Avenues to become a "shared street," thus opening greater sidewalk space with room for leisure and recreation while reducing vehicular speed (Warekar, 2; 3.24).

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⁴ As reported conducted by a private study in the wake of the Covid 2021 pandemic, the average sidewalk width surrounding the Chrysler is nearly 14 feet (Harvey, "Sidewalk Widths NYC").







Figures 3.23, 3.24, 3.25

3.4.2.1 Spatial Dimension

I. Dimensions

1. Duration

A. Beat

As an internationally prominent musician, Gustavo Dudamel's conducting style has been described as "fervent and extroverted" (Crowley, 6), just as the native Venezuelan is more inclined to communicate his programmed pieces in terms of "getting out of the routine of the music... and bringing the feeling back" (Phillips 2018). By

working with our definition of the beat as a regular reoccurring pulse, we can quote Charles McNulty, critic for the Los Angeles Times, who writes that "Dudamel... adjusts himself, chameleon-like, to the composition, shuttling the focus to where it ought to be" and that he can "expertly pin down silence, extending a John Adams hush with the same conducting intensity he summons for a Mahler crescendo." By exercising our imagination and creatively editing a photograph of Dudamel conducting (advertised alongside Beethoven's 9th Symphony by the LA Philharmonic⁶), we can illustrate how a conductor's motion provides a "pile-driving" effect and thus establishing musical order (3.26).

As an early skyscraper, the Chrysler Building was designed like most large commercial structures of the time; that is, a steel frame (3.28) encased with concrete or filled in with masonry. This frame consists of separate columns (3.27) and those were set into excavated footings, which were completed on March 13, 1929. Because Walter Chrysler insisted that the lobby be sufficiently grand and that obstructions like unnecessary columns be removed (Kingston, 169), four trusses were carried by these initiating columns, each two-stories tall while providing a large triangular space.

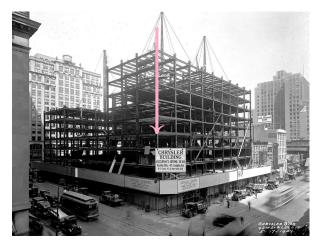
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⁵ "Gustavo Dudamel's Captivating Theatrics Serve the Music," Los Angeles Times (October 27, 2012).

⁶ "Dudamel Conducts Beethoven 9; Gustavo Dudamel and the LA Phil in Beethoven's Ninth—triumph!", April 20, 2018 at Walt Disney Concert Hall.







Figures 3.26, 3.27, 3.28

B. Meter

The "Ode to Joy" from the Ninth Symphony is undoubtedly a popular melody and its accessibility can be partially attributed to the tune's common-time signature. Across the work's four total movements though, the meter changes, increasingly from the first to fourth movements and with more complexity. In detail, this range includes (Table 3.1):

List 3.1: Time signatures

Movement I: 2/4

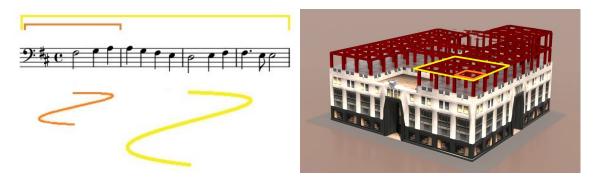
Movement II: 3/4, 2/2 (double cut-time), 3/4, 2/2 Movement III: 4/4 (cut-time), 3/4, 4/4, 3/4, 4/4, 12/8

Movement IV: 3/4, 2/4, 3/4, 4/4 (cut-time), 3/4, 4/4, 3/4, 4/4, 3/4, 4/4, 6/8,

3/2, 6/4, 2/2 (double cut-time), 3/4, 2/2

and yet when bridging the parallel into architecture, we can imagine that each measure is "spinning" by during a performance (orange bracket and swirl in 3.29), and those measures are part of hyper-meters, which group a greater number of measures within a formal section (yellow bracket and swirl).

Translating musical measurement, we find similarity to the Chrysler's structural lattice, since it is roughly characterized by a four cornered square as a whole. Likewise in Figure 3.30, which illustrates the building's fifth and beginning of the sixth floors, nine squares line their perimeter, except for East 43rd Street, where the columns, or "musical bars" increase to eleven. Regarding the Lexington Avenue side, where the amount of columns stays the same, the edifice recedes from the street above the third floor and that aspect will be discussed under its Stylistic Language. This side does, however, give insight to the musical concept of hypo- and hyper-meter, where peripheral cubes can be grouped into larger cubes. For example, on the lateral side facing the viewer in 3.30, one four-cornered cell (orange square) is grouped within a larger three-by-three cell (yellow square), protruding from either side above the skyscraper's entranceway. While a fixed-perspective still determines the yellow square to be "triple timed," versatility could calculate this as a "rotating" twelve-bar cycle and the orange square to be single-timed or a four-bar cycle respectively.



Figures 3.29⁷, 3.30

C. Rhythm

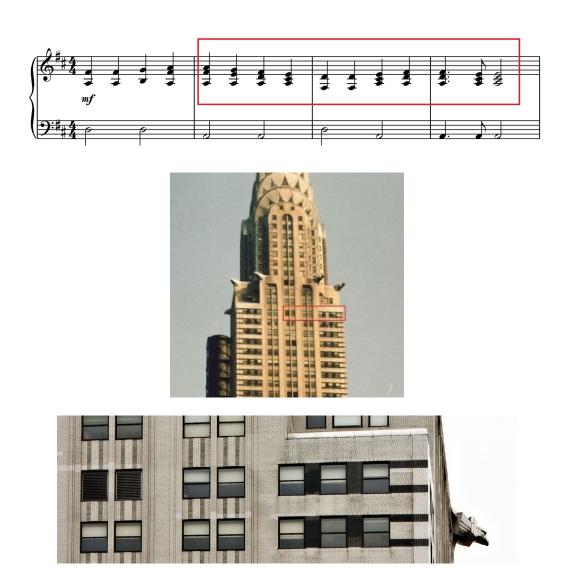
Continuing with "Ode to Joy," we point to a rather singular rhythm since a majority of the melody's quarter-notes align with 1-count beats "underneath." The accompanying bass of the music in this Hal Leonard arrangement⁸ has half-notes, while the last measure of the phrase has dotted quarters, thus providing a fairly broad range of rhythmic values in simpler patterns, across the selected passage (3.31).

The architecture of the Chrysler is known to have a wide variety of decorative features, but when focusing on the building's tower again in Figure 3.32, a subtle distinction arises. Firstly, accepting structural columns as grounded "beats," we can appreciate the overlapping brick-work as a rhythmic facade. We also see that each window is approximately the same size on the 58th floor, but the innermost bays have two window units, while the outermost have three. The length of their encasing spandrels is shorter and longer across time respectively, but if returning to corporate articles that

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When possible and to reflect the original intentions of both Beethoven and Van Alen, I've employed the first published edition of Symphony No. 9 and the earliest photographs of the Chrysler in this dissertation. Otherwise in this example and just as the Chrysler can be renovated, I am using a later piano reduction of the 9th Symphony (Pauer [Arranger], London: Augener [1900]), for greater clarity in suitable examples.
⁸ As freely arranged by Henry van Dyke through Sheet Music Now, this interpretation of "Ode to Joy" adds homorhythmic voices to the original melody, whereas Beethoven's scoring entailed more intricate polyphony.

equate to musical notes as architectural occupants, the closed window-panes in our pictured example are conspicuously "silent" (3.33).



Figures 3.31, 3.32, 3.33

D. Tempo

Like the piece's meter, the tempo of the Ninth Symphony becomes increasingly complex from its first to last movements. Previous research has shown, however, that some of the metronome markings have been incorrectly transmitted from Beethoven's

autographed manuscript and there is the suspicion that additional mistakes remain undiscovered (Noorduin, 129). Still by exercising currently accepted claims,⁹ we can list the following metronomic tempo changes throughout the piece, including those represented by Figures 3.34-35*:

List 3.2: Tempo markings

Movement I: Allegro ma non troppo, un poco maestoso J = 88Movement II: Molto vivace J = 116; Presto J = 116; Molto vivace

J. = 116

Movement III: Adagio molto e cantabile J = 60; Andante moderato J = 63Movement IV: Presto J = 96; Allegro ma non troppo J = 88; Allegro

moderato J = 80; Allegro assai J = 80; Allegro assai vivace,

Alla marcia J = 84; *Andante maestoso J = 72; *Adagio

ma non troppo, ma divoto J = 60; Allegro energico, sempre

ben marcato J = 84; Allegro ma non tanto J = 120;

Prestissimo = 132; Maestoso = 60

While metronome settings are easy to calculate mathematically, Figures 3.36-37 provide a more refined means of visualizing tempo since their phrases extend, or "stretch out" reiterated material with decelerating diminuendos in mm. 8-16¹⁰ of movement IV, and a *ritardando* and *poco adagio*, or "slightly slower" expression is marked at the end of mm. 38-47.

Seeking next to compare musical and architectural subjects and to revisit versatility, the Chrysler is characterized by tapering setbacks (3.38), starting on the sixteenth floor and contracting until reaching the building's crowned spire (3.39). A significant factor in the skyscraper's design was Manhattan's zoning resolution of 1916, which was adopted to prevent massive buildings from occluding light and air to the streets below through regulating constructed mass at certain heights, usually interpreted as a series of setbacks. Zoning stipulations were later revised by New York City's

⁹ Musedata 2009, "Beethoven: Symphony No. 9 in D minor, Op. 125."

¹⁰ Pauer's edition includes the expression marking of *Selon le caractère d'un Récitatif, mais in Tempo*, or "In the character of a Recitative, except for tempo."

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Department of City Planning in the 1960 Floor-Area-Ratio policy for succeeding skyscrapers, but when returning to our architectural premise of traversing around permanent structures by foot, GoogleMaps grossly approximates 42,000 square feet at the first floor (3.40) and 10,000 square feet at floor 58 (3.41), where the fifth platform ascends from ground level. If then using standard units of miles-per-hour¹¹ and a fixed walking gait,¹² the building's inverted "speed" would be 4.2 : 1 when descending architecturally, broadly akin to Beethoven's musical deceleration in the fourth movement from 72 or 60 bpm, or 6 : 5 by a factor of 12 (or 1.2 : 1).

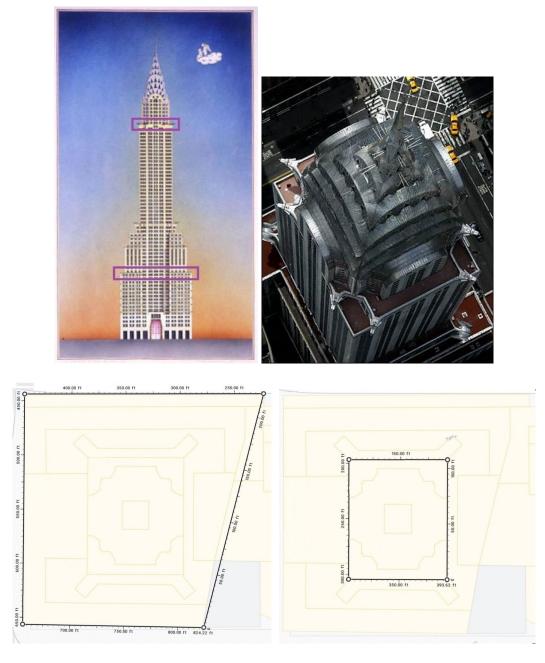


Figures 3.34, 3.35, 3.36, 3.37

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¹¹ International System of Units

¹² For middle-age men and women (ages 40-49), the average walking speed of a normal gait is 3.11 and 3.2 mph respectively (Beabout, "Here's the Average Walking Speed—and What It Says about Your Health").



Figures 3.38, 3.39, 3.40, 3.41

2. Pitch

A. Register

Musically, the highest notes achieved are during the fourth movement of the 9th Symphony, as performed by the piccolo at A^7 during *Prestissimo* J = 132 and its closing

measures (mm. 926-929). The lowest range is achieved during the fourth movement also, performed by the contrabassoon at D² (mm. 81-83) of the *Allegro assai* section. Structurally, we conceptualize the bracket of the staff as representing the musical system's apex (3.42), the apogee of which is set and adjusted by instrumental practicality and perceptibly limited by the human hearing range.

The Chrysler became the tallest building in the world for eleven months at 1,046 feet (3.43), until surpassed by the Empire State Building in May of 1931 (3.45). ¹³ Van Alen, as architect, was in competition with his former colleague, H. Craig Severance, who designed 40 Wall Street that was being erected concurrently in lower Manhattan. The New York public was stunned, however, when workers quickly raised and secured a needle atop the Chrysler that was secretly assembled within the building's elevator shafts (3.44).

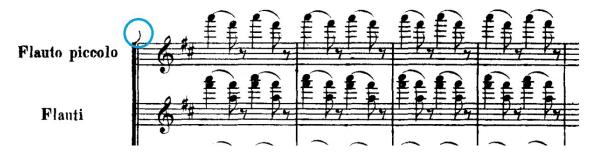
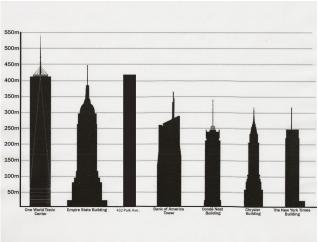


Figure 3.42

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¹³ The Chrysler in 2023 is tied with the New York Times Building for the 12th tallest building in Manhattan, both superseded by the current decade's skyscraper race alongside Central Park and what is called "Billionaires Row" (Wikipedia, "List of Tallest Buildings in New York City").



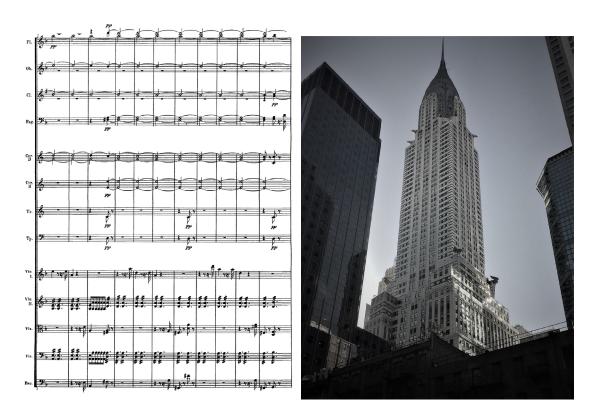


Figures 3.43, 3.44, 3.45

B. Range

The Ninth Symphony uses a wide tessitura between doubled flutes and violoncellos with contrabasses during movement I, as seen in mm. 168-178. Further organizing this sonic palette through sonata form, Beethoven dramatically emphasizes the transition from the exposition into its development section accordingly (3.46).

Striking something of a parallel, the Chrysler has a highly decorated spire with its terraced crown that is a cruciform groin vault of seven concentric members. From east and west elevations, the base of the building contains a central air shaft, with abstract reliefs on the 20th through 22nd-floor spandrels, while the 24th is floor is embellished with 9 foot (2.7 m) Nirosta pineapples. The tower has less ornamentation, although the corners of its base are "pinched out" with radiator-cap themed adornments between the 28th and 31st floors and then flanked with gargoyles on the 61st, to overcome an optical illusion where buildings that have horizontal bands seem broader at their tops, as recounted by Clute (1930; 3.47).



Figures 3.46, 3.47

C. Texture

With expression markings such as *Allegro ma non troppo, in poco maestoso* ("not too cheerful, and a little majestic"), it is of little surprise that Beethoven dramatizes mm. 397-404 during the recapitulation of the symphony's first movement. Here the texture is thick with a majority of the orchestra's instruments playing and it is enhanced by the music's contrary polyphony, as played by the downward wind and upward string sections respectively (3.48).

As mentioned prior, the Chrysler Building is endowed with 3,862 exterior windows, those below the crown being mostly even and closely spaced between structural beams, as illustrated in Figure 3.49. Vertically each floor is separated by spandrels, except for the spire, and the second and third which have larger continuous panes. It is of interest to note that Van Alen's original design called for the first floor to have open showroom windows that would reach three flights, while glass-wrapped corners would climb 12 stories, so as to create the effect of "resting on air" (Roth Pierpont, 74).





Figures 3.48, 3.49

3. Volume

A. Dynamics

Addressing music's third dimension, Beethoven uses dynamics as an integral element within Symphony No. 9. For example during movement II, select instruments of the orchestra, including the oboe and bassoon (3.50), swell from m. 79, crest together at m. 83 and decrescendo in m. 85, before the reunited ensemble enters staggered crescendi in mm. 86-89.

When looking for an example of depth in architecture, we need to go no further than the designed setbacks of the Chrysler once again. There are six platforms, outside of the domed crown's seven terraces, one of which is a proposed observation deck (circa 2020) between the 61st and 62nd floors (3.52); a planetary themed celestial deck was furnished on the 71st floor, but has been closed to the public since 1945. The role of orientation becomes critical once more, when noting how two of the four sides of the building have a unique feature: the northwest face is U-shaped between the 4th and 64th floors (3.51); the southwest is oblique, as part of a greater trapezoid; the northeast and southeast sides are similar with sheer walls jutting from street-level to the 16th floor, adding aesthetic balance to the building's design.



Figures 3.50, 3.51, 3.52

PROPOSED

4. Timbre

For our last element, but firstly for tone-color, our examination is limited under eighteenth-into-nineteenth century practice, since Beethoven and his contemporaries rarely specified sonic hues in their written music. Much speculation has been written about Mozart's sense of timbre as related to keys and tuning (Pinnegar, 5), and scientific developments connecting the color wheel to sound have occurred since (Meyer, ils. 2). Drawing on the idea of visualizing the Ninth Symphony and as told by programmer, Stephen Malinowski, however, colors can be assigned through more subjective association, with "flesh-like hues" for voice, "wood-like" for strings, and "brass-like" for the brass (3.53). Objective representation of tone may still be elusive in music and there's no indication in the Braunschweig: Henry Litolff's Verlag (Dover 1989) edition of the symphony, but continuing with Malinowski's approach, he states that "brighter colors were used for higher instruments" in his earlier works, and then refined for a degree of aesthetic sensibility. ¹⁴ Changing sources to the animated work of Joy Cohn, ¹⁵ we are able to coordinate Figures 3.53-54 (9:15 time-stamp) during the symphony's fourth movement (circa m. 322 and dramatically preceding the Alla Marcia), where the grain of sound has a peak amid a broadly "bumpy" waveform.

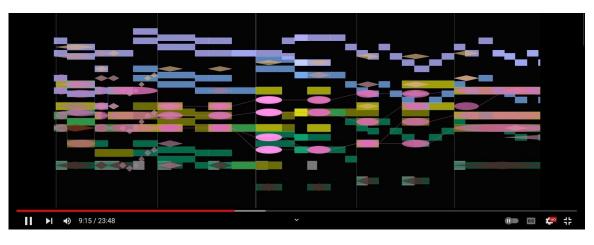
Regarding color, tone and grain, the physical composition of the Chrysler Building is readily perceptible and makes its appreciation to tourists that much more evident. Walter Chrysler had told Van Alen to spare no expense on the details (Kingston, 175), where the more notable examples include white bricks interspersed by white-marble bands for a tessellate appearance from the third to the seventy-first floors. Above the third setback, consisting of the 24th through 27th floors, the facade contains horizontal bands and zigzagged gray-and-black brick motifs. The windows are without sills, but are framed in black metal, while the ending spandrels contains horizontal rows of black brick (3.56). The crown is clad with stainless Nirosta steel, known for its natural

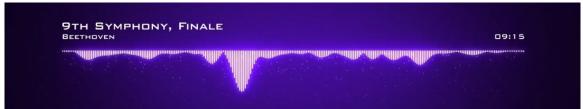
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¹⁴ Related interview conducted through personal correspondence (email dated November 19, 2022).

¹⁵ No Copyright Music 2020, Audio Library Visualization (youtube.com/@NCALIB/about).

sheen and is electrically lit in the evenings till 6 a.m. The dome is likewise illuminated by fluorescent lights within the crown's triangular windows and colored floodlights for the face of the building, allowing it to be lit in a variety of schemes for special occasions (3.57). Metaphorically, electrical light could be equated to elevated spirit in music, although that topic remains outside the scope of this Spectrum and more appropriately under the seventh. For an example of grain, the ground floor exterior is covered in polished black granite from Shastone, a granite fabricating company located in Great Neck, New York ¹⁶ (3.55).





Figures 3.53, 3.54

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¹⁶ Shastone Memorials, "A Brief History" (shastone.com/about).



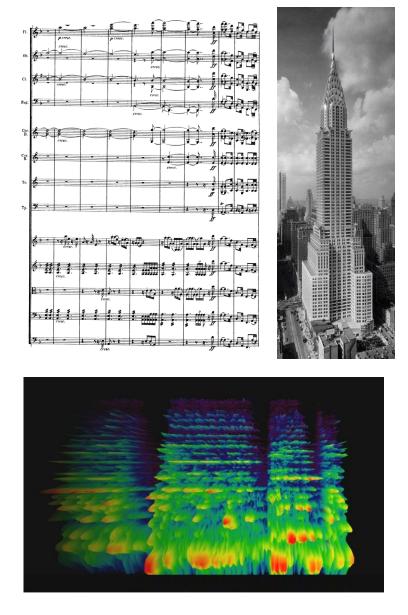
Figures 3.55, 3.56, 3.57

3.4.2.1.2 External Appearance

Culminating our study with dimensions onto musical topography, we are able to utilize Chrome Music Lab (Morrill and Smus and Use All Five), where a spectrogram shows the frequencies that make up a sound; in this case, mm. 17-18 in movement I of Beethoven's 9th Symphony. As can be seen in the notated score, loudness progressively increases across the strings, horns and winds, peaking and holding at fortissimo with the

whole orchestra (3.58). Thus the waveform roughly protrudes from low to high over time, with gaps where silence occurs between notes (3.60).

Looking at the Chrysler Building from Third Avenue and before Chrysler East had been constructed in 1952, many of the dimensions we've previously discussed are now integrated into this rear facade, evident through the benefit of visually tangible perception (3.59).



Figures 3.58, 3.59, 3.60

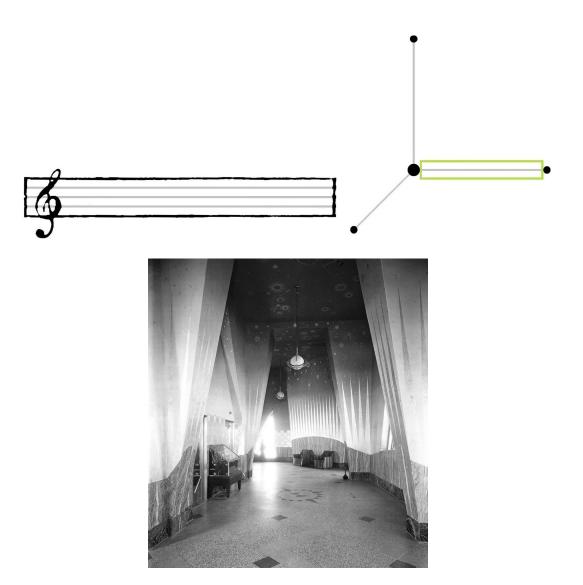
3.4.2.2 Stylistic Language

Spectrum 3

A. Fundamental cell

Beginning our study of the Ninth Symphony's internal mechanics, we start with a redaction of the first measure (conveniently the flute atop, though any part suffices) from the full orchestral score. Here in the piece's first commercial publication (Schott 1826), the key and time signature and its whole rest are edited out (treble clef remaining as a necessary musical indication; Fig. 3.61), while showing some resemblance to a rotary block within our structural model (3.62).

As a fine example of a designed room and previously discussed, the Chrysler Building had an observatory on its highest available story, which is the 71st. Being in the base of the crown, the walls are vaulted and serve to accent its cosmic décor with a compass and stellar floor tiling. A display case was installed with Walter Chrysler's toolbox, several of those therein he made himself while working at Union Pacific as a machinist, before leaving the railway business to work at Buick Motors, and then establishing his own automotive company in 1925. The observatory was open between 1930 and 1945. During the 1980s, it was remodeled for offices and today, the space is rented by a British consulting firm (Fig. 3.63).



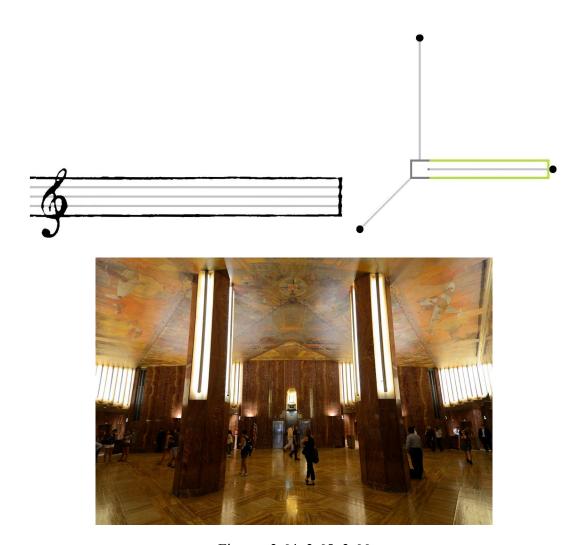
Figures 3.61, 3.62, 3.63

B. Rudimentary port

Representing access within our musical sample, the left bar of Beethoven's measure is cleared as an entryway (3.64), systematically showing an opened berth (3.65).

For the lobby of the Chrysler Building, it is primarily accessed by three entrances, where the central hallway stemming from Lexington Avenue and its two wings spread out symmetrically between 42nd and 43rd Streets. Above the Lexington and 42nd doors

are etched-glass panels, which permit natural light to illuminate through and to compliment the lobby's fluorescent lights for an intimate atmosphere (3.66).



Figures 3.64, 3.65, 3.66

C.i. Simpler gate A

Continuing without significant distinction from our theoretical model of tonality into Beethoven's Symphony No. 9, we build a functional "door", both musically (3.67) and mechanically (3.68).

As primary architect for the Chrysler Building, Van Alen was praised for his modern aesthetic, which included interior designs (Murchison 1930, 24). In 2014, however, renovations were made by Gensler, a global architecture firm founded in 1965 in California. Here updated conference spaces include a town hall-style meeting room and break-out area, fitted with a sliding glass door (3.69).



Figures 3.67, 3.68, 3.69

C.ii. Simpler gate B

As the opposite of an open door musically and mechanically, here we represent one that is closed regarding Beethoven's 9th Symphony (3.70) and with our evolving tonal model (3.71).

As members of the Global Workspace Association, Office Providers is a browsing service for business customers who wish to find their ideal working environment. Though having access to over 3,000 locations across 120 countries, an executive suite on the 26th floor of the Chrysler Building is shown here with various amenities, including for our purposes, functioning doors between other rooms (3.72).

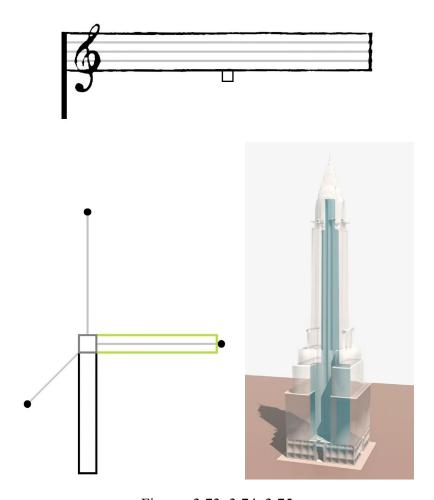


Figures 3.70, 3.71, 3.72

D. Central bore

There is still little distinction from our theoretical model to Beethoven's Symphony No. 9, represented by the same construction of a polar shaft (3.74) with a slight change on the musical staff (3.73) respectively.

Within the Chrysler Building's 77-story steel frame, there is an inner core which also contains the elevator shafts, stairs, and other mechanical plant systems. At the time of completion, three of its continuous elevators, or lift shafts, became the longest in the world (3.75).



Figures 3.73, 3.74, 3.75

E. Physiological stability

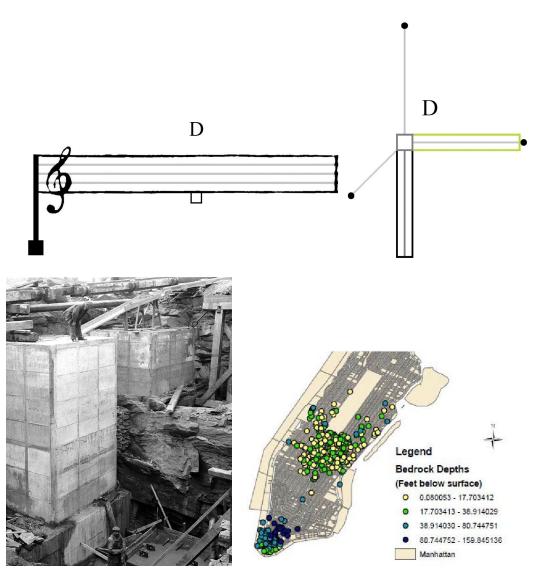
Building theoretically on musical tuning, we'll calibrate Symphony No. 9's grounding point to D (3.76-77), as stated within Opus 125's published title and comprehensive minor key, and verified by Beethoven in his preliminary sketches when commissioned in 1817.

In order to secure a solid foundation architecturally, modern construction begins by removing soil and digging a pit to reach bedrock, where footings are blasted or drilled and then fit with steel or reinforced concrete columns. Figure 3.78 shows part of the site confining the Chrysler Building's 69-foot-deep shafts that were excavated and shored by Godwin Construction Company of New York, upon which the total of columns and girders were set. Geologically, Manhattan island is built on three rock strata known as Manhattan Schist, Inwood Marble and Fordham Gneiss, the latter of which supports midtown and the Chrysler, and is most conducive for excavation over a lesser depth (3.79). Published studies for building resonance have not been available for the Chrysler and exact calculations would involve sophisticated mathematics, beyond the scope of this dissertation. Though the Building is without the benefit of technological advances such as spring dampers or padded rollers, the area around its central elevator shafts is more tightly fortified by a steel truss and braced with diagonal beams, effectively forming a vertical cantilever (Gunel and Ilgin, 2667). As for quantifying some kind of value, Ron Klemencic, 2016 recipient of the Fazlur R. Khan Lifetime Achievement Medal and Chairman and CEO of Magnusson Klemencic Associates, has proposed a rule-of-thumb

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¹ Babaei, Ghannadiasl and Yaghoub 2021, "Free Vibration and Frequency Calculation in Tall Buildings with Stepped Tube-in-Tube Systems."

for modern skyscraper sway, "tuned" by wind load safety restrictions:² divide a building's height by 500.³ Thus for the Chrysler which stands at 1,046 feet, its average sway, or horizontal deflection would be 2.092 feet.



Figures 3.76, 3.77, 3.78, 3.79

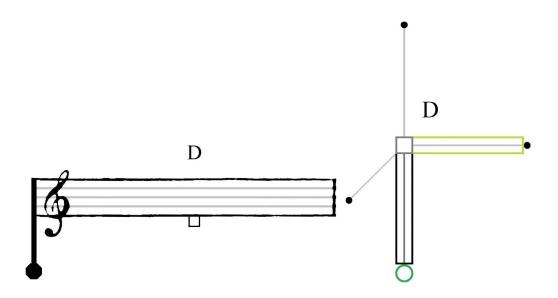
² In its most recent publication (The 2021 International Building Code: A Compilation of Wind Resistant Provisions) and in accordance with the International Code Council, Federal Emergency Management Agency (FEMA) stipulates that "The deflection of framing members supporting glass subjected to 0.6 times the 'component and cladding' wind loads shall not exceed 1/175 of the length of span of the framing member, for framing members having a length not more than 13 feet 6 inches (4115 mm)" [1604.3.7]; the window frames for the Chrysler Building average five feet high within thirteen-foot floor averages.

³ The Free Library 2010, "World's Tallest Building in Dubai Sways Back and Forth about 5.5 feet."

F. Pivotal hinge

Deferring to versatility again, the rounded terminus at the end of the bracketed staff indicates that the Ninth Symphony is capable of dynamic motion (3.80), grounded from a D musical system (3.81).

The engineering for the Chrysler Building is otherwise straightforward regarding joint construction, where horizontal beams and girders are fastened to a vertical column through bolted brackets. Terracotta blocks, or "arches" fireproof the cast iron framing, a popular choice into the 1930s since the mixed material is lightweight, moldable, and could be mass-produced (3.82).



Figures 3.80, 3.81

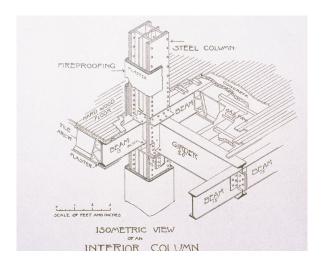


Figure 3.82

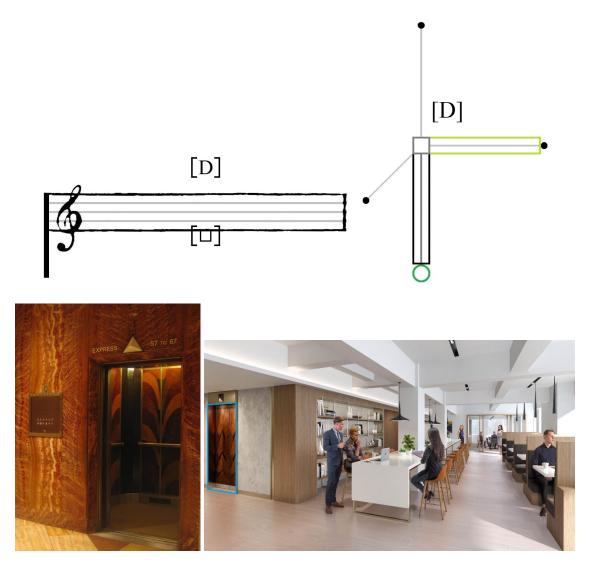
G. Momentary address

Assuming that Beethoven's piece is systematically grounded (3.84), we discontinue the staff's barbed terminus and bracket D as a movable, yet connected sonic root (3.83).

The spacious (8' wide x 5.5' deep) elevator cabs for the Chrysler Building were given extra attention when covered with exotic woods and decorated to resemble "palm fronds among curved lilies," as described by Curcio.⁴ The inside of each cab has elements that were influenced by ancient Egyptian and traditional Mexican designs, which similarly impacted the Art Deco style (3.85). Otherwise in this promotional still of the Chrysler Club's Pantry, we can appreciate its café-style environment for casual working or socializing with colleagues. Tenants subsequently access this room with amenities through the building's signature elevator door, as seen in Fig. 3.86.

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 $^{^{\}rm 4}$ "Chrysler: The Life and Times of an Automotive Genius" 2000, 428.

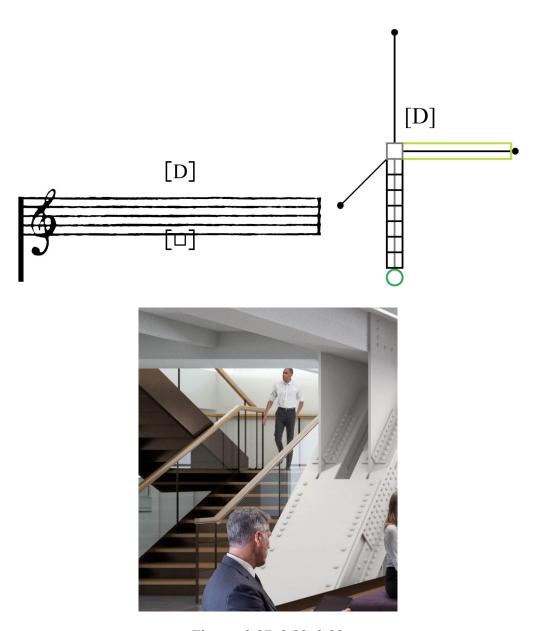


Figures 3.83, 3.84, 3.85, 3.86

H. Ascending grade

Like most classical pieces, musical steps are wholly integral to Symphony No. 9, represented by the partially unredacted first measure of Schott's 1826 edition (3.87). One can see how steps prepare for either ascending or descending sounds within the piece's system and when moving into a rooted D (3.88).

While modern floor plates in the Chrysler permit the flexibility to create large open workplaces or traditional office suites, we also see how emergency staircases become available in this still from the building's website. Reaching from ground level to the 23rd floor, Fig. 3.89 shows a flight of steps, in contrast to Art Deco styling found in the central stairwell.

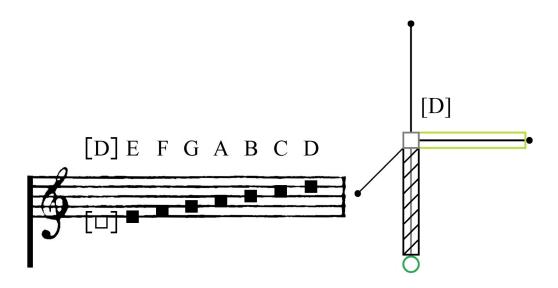


Figures 3.87, 3.88, 3.89

I. Arboreal drive

Giving more definition to Symphony No. 9, its root musically extends with a scale built on D (3.90). By nature of versatility, the piece's tonal system assumes an axial pinion, while connecting the sonic scale as a driving force (3.91).

With connections between the second and first floors and basement, the Chrysler has staircases that are decorated with terrazzo steps, marble walls, and Nirosta-steel railings. The outer walls are clad with marble strips that are slightly angled to each other, giving the impression of being curved, while symbolically adding to a sense of busied motion. The inner railings are designed with zigzagging Art Deco motifs also, complemented by aluminum-leaf ceilings and bulbous glass chandeliers (3.92).



Figures 3.90, 3.91



Figure 3.92

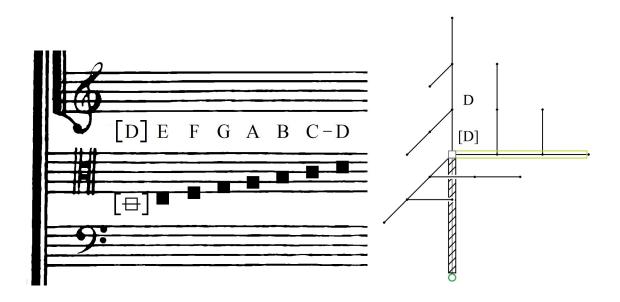
J. Modular accumulation

We continue to define the 9th Symphony in structural terms, building upright levels through octave doublings (3.94) and sonic tessituras (3.93), both calibrated to D again as a grounded root. If following convention, where the height of a story is determined by room-ceiling height, plus the thickness of the flooring between each structural pane,⁵ our "story count" between D² and A⁷ yields five-and-a-half octaves, while still allowing notes to freely cross tessitura.

When given a top-floor height of 899 feet and divided by 77 floors (partially pictured during construction, 3.96), the average floor-to-ceiling achieved by the Chrysler is 11.67 feet. The building was built during the peak of the Art Deco art movement in the United States, a style which combined fine craftsmanship and rich materials with economic industry amid technological progress. Art Deco emerged from the shadow of

⁵ Curtis Jackson 2023, "How Tall Is a Story in a Building?" (Bindley Hardware & Co, Inc).

the Victorian era, an age known for opulence and grand proportions in architecture, particularly among homes where its floor-to-ceiling height average was 13 feet.⁶ Interestingly, the first modern skyscraper, The Home Insurance Building in Chicago, was built in 1885 and is historically concurrent with Queen Victoria's reign, which ended in 1901. Being a tall building that was supported by a unique structural steel frame, it originally had an average of 13.8 feet (138 feet divided by 10 floors) and two stories were added in 1891, to a finished height of 180. In contrast though and as seen in the 1952 photo of General Hanover Bank's entrance hall (3.95), it can be said that the Chrysler is truer to modern trends when emphasizing conservative spacing.

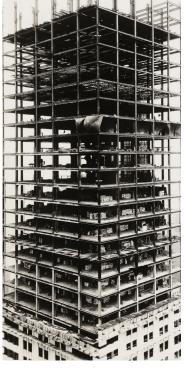


Figures 3.93, 3.94

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⁶ Bill Primavera 2018, "A House's Ceiling Height Has Evolved Over the Years" (The Examiner News).



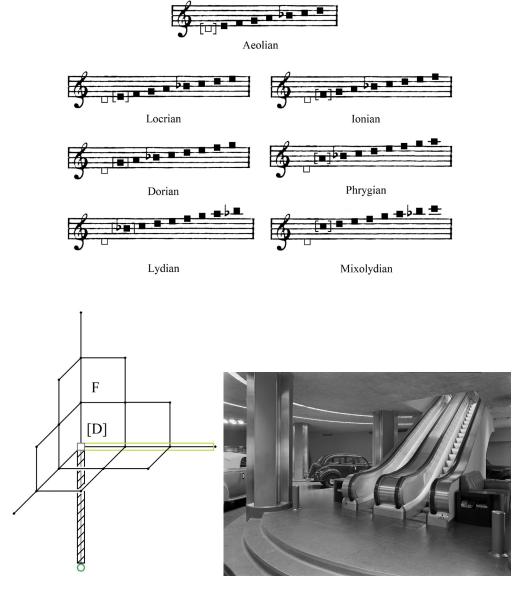


Figures 3.95, 3.96

K. Multiplicative arrangement

Our structure expands for Symphony No. 9, when classifying its modal profile; in this case, beginning with D Aeolian and moving onto C Mixolydian (3.97). Our model similarly recognizes how F major is a scalar relative to D minor, and how the musical system is interconnected above a deeper base (3.98).

As an architectural example of interceding steps, the Chrysler held an "Automobile Salon" on its the first and second floor showrooms (near the corner of Lexington Avenue and 42nd Streets) until the 1960s. In Figure 3.99, several steps lead to a lower tableau during the exhibition, just as a central escalator had platformed to a circular landing from the main floor above.

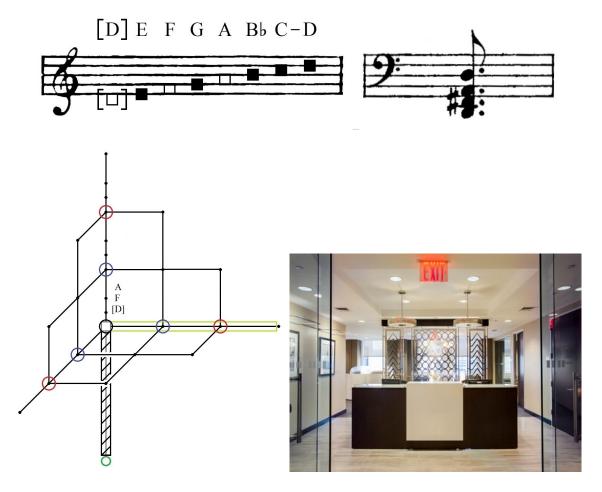


Figures 3.97, 3.98, 3.99

L. Manifold configuration

Upgrading the configuration of Beethoven's opus, our musical system outlines a D minor triad structurally (3.102), with modifications found in Beethoven's expressive score (e.g., major triad, movement I, m. 23 [piano reduction]; 3.101).

Revisiting serviced offices in the Chrysler as described by Global Workspace, executive suites provide a number of facilities and doors thereof, including the business's reception area, staff lounge, meeting rooms, and break-out areas for spontaneous collaboration (3.103). It is of interest how passageways are created as "doors" between modular furniture, suggesting rooms within rooms and likewise, how triadic members may be distinguished with a musical root and a direct connection to deeper grounding (3.100).

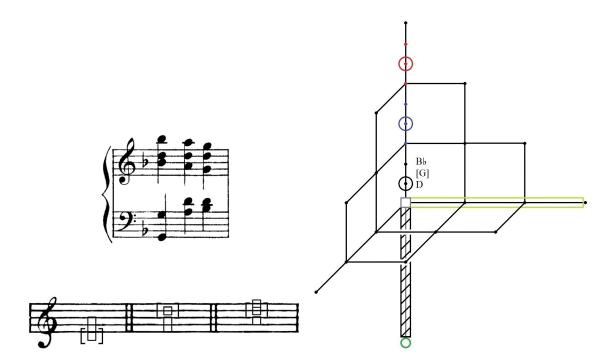


Figures 3.100, 3.101, 3.102, 3.103

M. Erective modification

Outlining triadic inversions, the structure of Symphony No. 9 continues to be grounded upon D (3.105), though both a G minor chord in root position and first inversion is spelled in movement II, m. 59, for example ([piano reduction]; 3.104). An important point to notice is how triadic voicing can easily exceed the standard registered octave. Reconciling this wider tessitura, the tonal model is able to accommodate by opening space across a "two-flight" chamber, although a one-octave first inversion on D is illustrated in this example (3.106).

Enlarging a photograph provided by the Chrysler Building's website and used previously here concerning temporary address, gradient steps elevate to an exit for a proposed balcony set-back; a doorway from the elevator car is assumed as being floorplan level, though out of scope of this image (3.107).



Figures 3.104, 3.105, 3.106

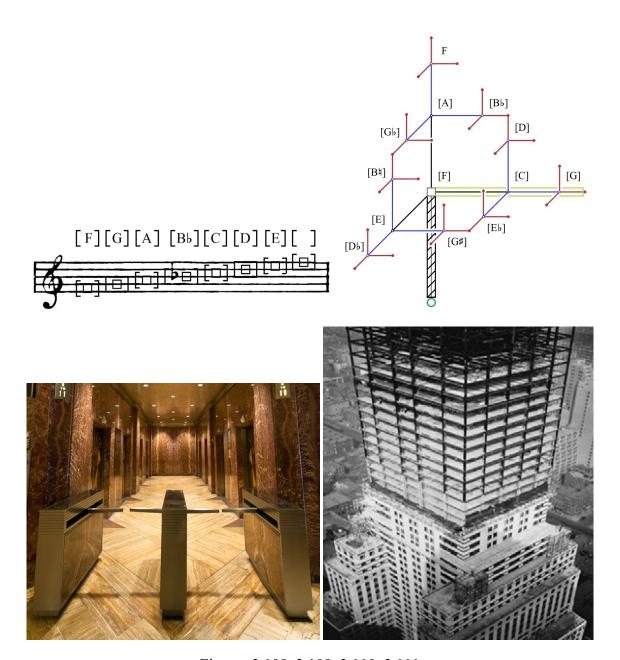


Figure 3.107

N. Constitutional structure

Accepting major as standard for musical modes, an F scale is outlined for the Ninth Symphony, but with open ports to indicate the options of a deeper connection to sonic meaning (3.108). Though a more specific order will be pursued in the ensuing analysis and it's most conventional for composers to operate in one key at a time during a piece, our complex array posits that numerous keys of the tonal aggregate can be poised for dramatic purposes (3.109).

Pictured is a hallway in the Chrysler lobby, leading to the building's bank of elevator shafts, regarding Fig. 3.110. Continuing the comparison between musical notes and architectural occupants, the skyscraper's multiple stories become accessible by the elevator cars' landing. When recalling also that the banks are grounded to a stable reference, levels within the construction become identifiable accordingly (3.111).

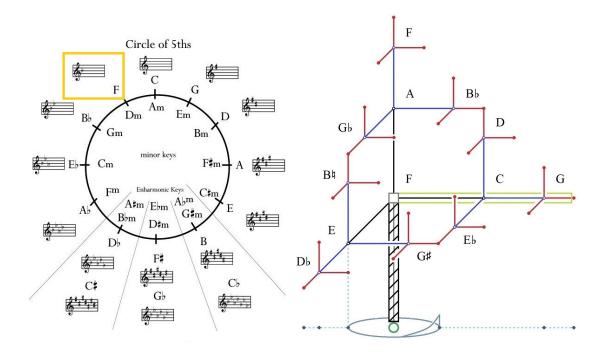


Figures 3.108, 3.109, 3.110, 3.111

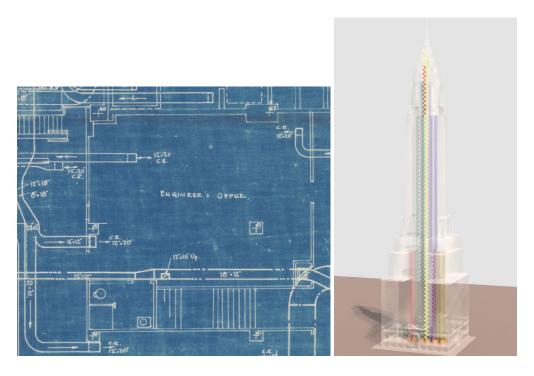
O. Accessible catalog

Working with Symphony No. 9, we recognize where D minor/F major is located on the musical circle of fifths (3.112). We continue also as the sonic system can access stored meaning within a shifting magazine or repository, beginning with the F tonic (3.113).

The original blueprints of the Chrysler give privileges to the reader who studies architecture, in this case showing a room for dedicated engineering in its cellar (3.114). Other chambers on the floor include a boiler and telephone room and a steam-meter room, yet stowage for content on all levels is accessible across the building via elevator shafts and stairways. These staircases reach select setbacks, however the central stairwell accesses the 71st floor at its highest point (3.115).



Figures 3.112, 3.113



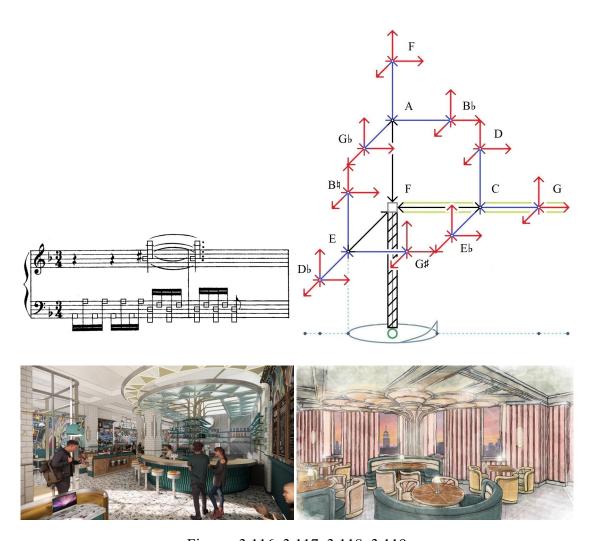
Figures 3.114, 3.115

P. Compatible Accordance

Echoing the opening bars of movement IV, which have been described as *Schreckensfanfare*, or "horror fanfare" (Wagner, 275) with an octave-doubled Bb against a first inversion d minor tonic, mm. 209-210 plays a vii^o2⁴ against a second inversion minor tonic pedal (3.116) for arguably even greater dissonance. Though our tonal model illustrates how deeper chambers might be set in noncongruent relations (3.117), sounding notes can also affect a sense of tension and relaxation on a surface level, shown again in the measured example of Beethoven's music.

For the Chrysler Building, David Rockwell of the Rockwell Architect Group has designed the all-American Chrysler Diner, which is set to serve street-level customers during morning rush-hour. Despite this being a more decorative (conceptually parallel to a musical score's embellishment) than structural example, one can see how the sharply

angled trellis and floor tiles, inspired by the building's crowned windows, interplay with a jagged wall behind the serving counter (3.118). This busy dissonance, or clashing of patterns, is contrasted with a proposed reopening of the Cloud Club, a once private consortium of wealthy businessmen and their celebrity guests, including the Texaco corporation that rented fourteen floors of the Chrysler when originally opening. Reimagined by AD100 interior decorator Ken Fulk, the Cloud Club's current design features more conspicuous examples of rounded elegance and contiguous lines, including its crested pilaster and seated furniture accordingly (3.119).

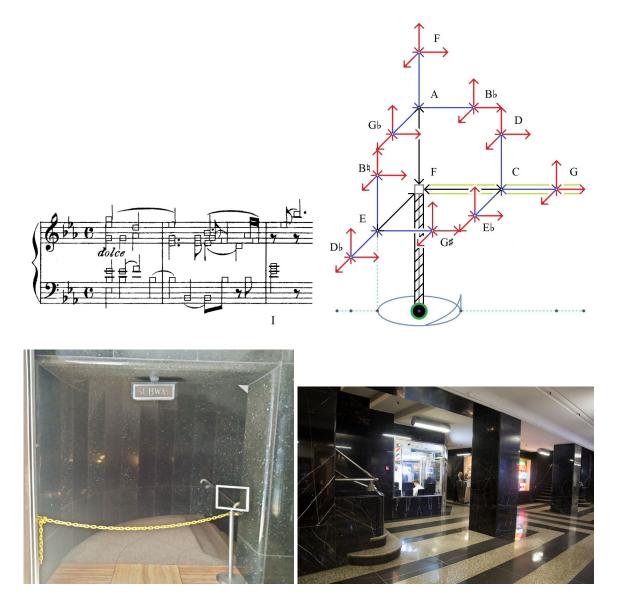


Figures 3.116, 3.117, 3.118, 3.119

Q. Tractional core

Our musical model for Symphony No. 9 hasn't changed its twelve available tonoi, but if accepting a deeper source by which to endow sonic meaning, we find a parallel akin to Schenker's concept of an Ur-tonic, and a "well" below the piece's leading key of F major (3.121). Beethoven's piece is thus replete with instances of tonal harmony, including Eb (movement III, mm. 83-85; piano reduction; 3.120) as one of several keys which the opus maneuvers to during performance.

Although sued by Interborough Rapid Transit Company in an effort to block construction due to purported overcrowding, Walter Chrysler personally paid for a subway entrance to be made at the building's arcade level. Thus en route to the New York City Subway's S and 4, 5, 6, and 7 trains, a number of businesses have thrived, including a barbershop, dry cleaner, and optician (3.123). A return to original blueprints of the Chrysler shows a boiler room, steam meter room, and pump and tank room at the basement level as well. Duct work and plumbing from these reservoirs properly belongs to Spectrum 5, however we metaphorically note that the "heart" of a building might not be centrally located in a built body, but rather at its base. As for the subway system underneath the Chrysler, the building's original entrance on East 43rd was opened to the public in May 1930 (3.122) and a second later opened on East 42nd, both providing pedestrians underpass access to Grand Central station nearby on East 42nd Street and Park Avenue.



Figures 3.120, 3.121, 3.122, 3.123

R. Adjustable calculation

Given the function of modulation, we ably adjust Beethoven's musical system to accommodate both a deeper underpinning and the more active surface of tonality. Thus I propose that the deepest tonoi and crux of our model is Eb, primarily by triadic extension [Eb, G, Bb, D major], just as the key appears briefly (mm. 83-98; 3.124) in the

symphony's third movement. Other keys are positioned more closely to the music's working surface [D minor being relative to F major], while remote [B/(Cb) major] or unused keys [F# major] are not as pivotal and remain peripheral (tonoi assuming major modality with single and then doubled circles to notate beginning and ending transpositions in Fig. 3.125, and Table 3.3 showing minor keys in lower-case).

List 3.3: Key schematic

Movement I

d, Bb, d

Movement II

d, G, d, D, d, G, d

Movement III

Bb, D, Bb, G, Eb, Bb

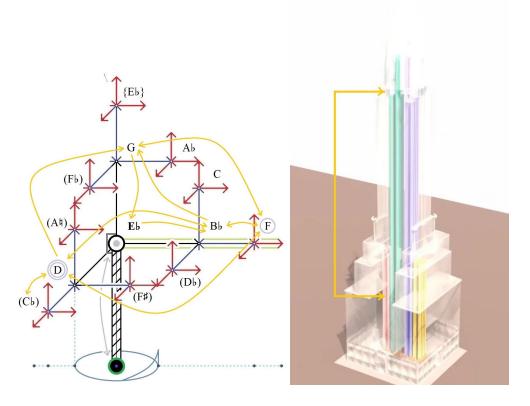
Movement IV

d, Bb, d, D, F, D, Bb, D, G, F, Bb, D, D, B, D

Among the Chrysler's 32 elevator cabs, eight are clustered into four banks, 28 of which were for passenger use when the building opened. Each bank serves different floors within the skyscraper, with several express elevators going from the lobby to a few landings in between. Local elevators connect these landings with other floors above, as we consider the ground floor to be a fixed reference for the shafts in total (3.126).



Figure 3.124



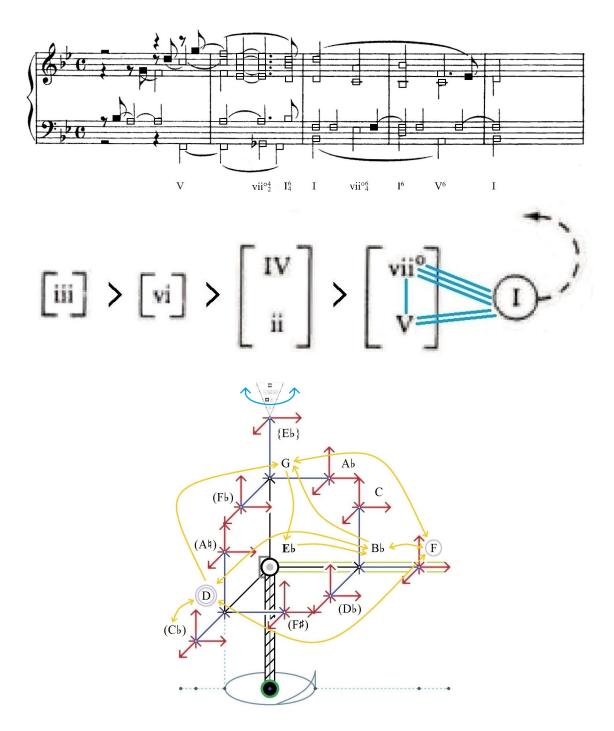
Figures 3.125, 3.126

S. Exchangeable synchronization

Analytically for the 9th Symphony, its musical content becomes more exacting, since Beethoven shifts from dominant to leading-tone and eventually resolves to tonic harmony in movement III, mm. 1-5 (3.127). Despite this preponderance of anterior harmony, for example (3.128), the greater orientation of keys is represented dynamically, where reciprocating arrows show how Beethoven starts in D minor and ultimately finishes in D major (3.129).

Given its versatility, the design of the Chrysler is able to represent harmonic adjustment by room orientation, where tonoi are akin to portal doorways with respect to a grounded source. Thus for example (3.130), Floor 65 is characterized by an open floor plan with sub-divided walls for roughly a dozen enclosures that will be similarly

"harmonized" in 3.42 A d-e and B e-f. Still we can imagine the musical parallel to architecture, where the exterior walls of the Chrysler would rotate "mechanically" regarding perceptible observation (3.131).



Figures 3.127, 3.128, 3.129



Figures 3.130, 3.131

T. Digital outlet

Beethoven dramatically prepares the introduction of a vocal *Recitativo* in movement IV, after several adaptations of musical material from instrumental solos. Measures 9-17 thus have unison celli and basses perform an extensive sounding line, after a flurry of activity from the wind and horn sections with tympani. This textural exchange reiterates thematic references from prior movements, before the introduction and development of the "Ode to Joy" occurs in m. 92 across the orchestra. Nevertheless, the baritone soloist's appearance (3.133; mm. 217-222) attains historical significance, when recognizing that the combination of a vocal choir with a symphonic medium had been a ground-breaking choice (lyrics as a poetic addition to the subject of music are considered a separate discussion outside of this study). More specifically among tonality's twelve key total, the melody here is set within D minor and structurally, its content is directed towards a perceivable surface (3.132).

The architecture of the Chrysler Building can be considered fairly "melodic," particularly between the 24th through 27th floors, where the facade contains black-and-white horizontal bands and "arrowhead" gray-and-black brick motifs. While the capacity of the building doesn't protrude, the vertical alignment of its windows and arranged colors across several floors, thus intimates as a wider "tessitura." Additional interest can be found if surveying the 27th through 31st floors, where a frieze of automobiles with hubcaps amid alternating tones is set, symbolizing both the Chrysler Corporation and its aesthetic of modern progress. Capped on either side of the facade are the famous "bonnet" embellishments, which resemble stately hood ornaments installed on Chrysler vehicles and that were popular the during the early-to-mid twentieth century (3.134).

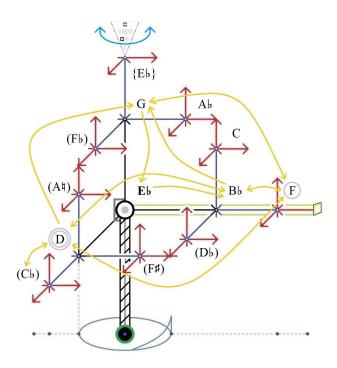


Figure 3.132

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⁷ John B. Stranges, 2014, "Mr. Chrysler's Building: Merging Design and Technology in the Machine Age."





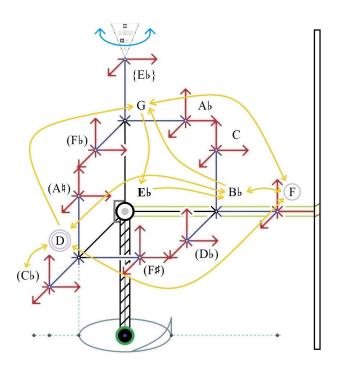
Figures 3.133, 3.134

U. Tactical unification

Revisiting the musical score with harmonic annotation as a "transparently" frontal view (3.136), we employ mm. 21-28 from movement II of Symphony No. 9 (piano reduction used for simplicity). In this example, the key is set again in D minor, while polyphonic lines pass by at the surface level of sonic perception, unified with the model's projective plane (3.135).

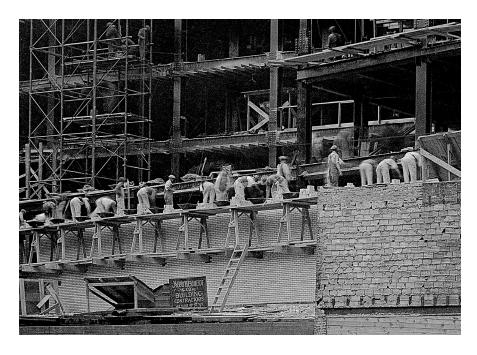
The Chrysler today enjoys the distinction of being the tallest brick building in the world with a steel framework. As seen in Figure 3.137, approximately 3,826,000 bricks were manually laid by dozens of workers, who were subcontracted by the Jacob Gescheidt Company. After the structure's steel had been erected to the twelfth floor, masons quickly worked from relative safety on support provided by the Patent Scaffold

Company, and the last brick was set on October 15, 1929. Assembling these edificial walls, beyond a rigid structure, further allowed an easier fashioning of the skyscraper's outward appearance.





Figures 3.135, 3.136



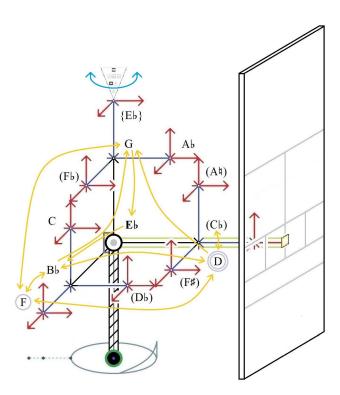
Figures 3.137

V.i. Modular organization i

Arriving at the Ninth Symphony's most popular and perhaps universal theme, "Ode to Joy" gives us the opportunity to frame its compositional organization over a mechanical structure. We thus employ a piano reduction of the melody, when first introduced in mm. 93-108 of movement IV and performed as a monophonic line (3.139). At this point, the audible music is set in D major, having modulated from D minor at the beginning of the movement, and hence the intermediate fulcrums of D and Bb rotate between reserved and coupled positions unto the model's idealized plane (3.138).

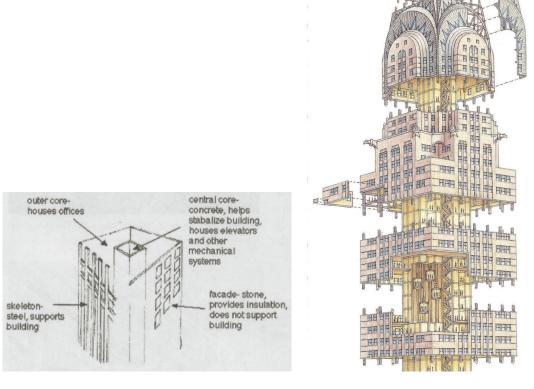
Being a modern construction, but in the early stages of skyscraper design, the Chrysler represents a wave of technological innovations, which include fireproofed iron-framed structures and equipped amenities such as the elevator and electric lighting. Specifically in this example, a steel frame is filled with masonry and covered with areas

of decorative metal cladding (3.140), while the building's inner core is made of concrete and houses the elevators, stairs, and its primary mechanical system (3.141). Despite putting pressure on Van Alen's talents to adjust to William H. Reynolds' initial plans as real estate developer, Walter Chrysler was reportedly enthusiastic about offering ingenious ideas to successfully complete the world's tallest and as can be seen, an architecturally striking building (Stranges, 1).





Figures 3.138, 3.139



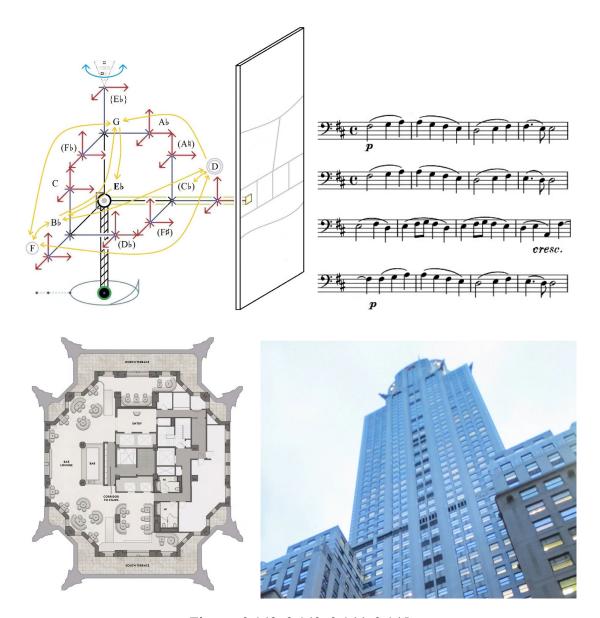
Figures 3.140, 3.141

V.ii. Modular organization ii

The melody of "Ode to Joy" presents a striking dynamic, where its original score is *pianissimo* and then at the end of the third phrase, a brief but intense *crescendo* occurs, before retreating back to *pianissimo* and closing the music's formal period (3.143). Regarding our tonal model, we see how its underlying structure supports sounding notes on the musical surface, just as its scored edifice protrudes outward during the *crescendo* within the third phrase (3.142).

As a parallel in architecture, the 61st floor on the northwest side of the Chrysler Building enjoys both event-space within its composed edifice (3.145), and access to an extended terrace outdoors. As current owners of the property, RFR Realty management has likewise planned to revive the renowned Cloud Club on this floor with a glamorous

bar, lounge and dining areas,⁸ just as guests have a closer look at the famous eagle gargoyles which adorn the north and south terraces (3.144).



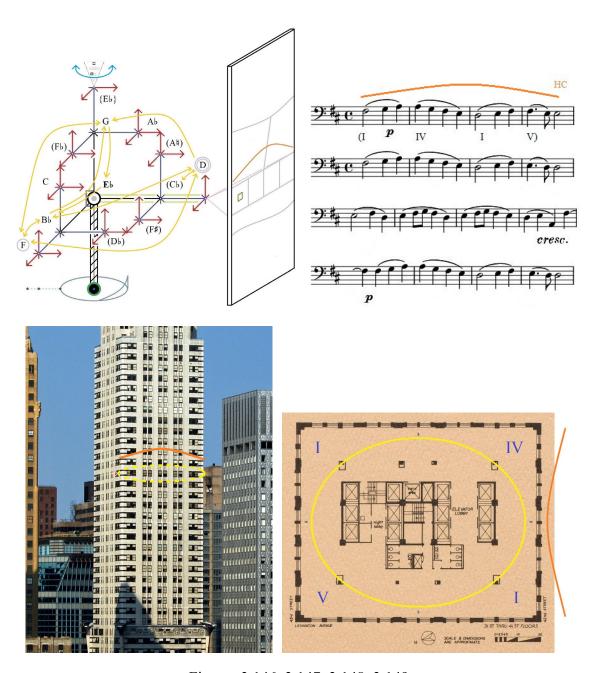
Figures 3.142, 3.143, 3.144, 3.145

⁸ RFR Holding LLC, 04/02/2019, "Chrysler Building Leasing Information."

W.i. Coordinated sequence i

Visiting "Ode to Joy" once again, harmonic analysis becomes more appreciable since we can ascribe a tonic - subdominant - tonic - dominant progression from the string's polyphonic accompaniment during mm. 117-120 (3.147). Our integrated model represents these musical measures as frontal chambers, and this continues to be identified with the portal key of D major (3.146).

From music, the parallel to the Chrysler Building might appear fanciful concerning phrasing, however if harnessing the tower's edifice on East 42nd Street, illustrations of harmonic "coursing" may prove effective. Subsequently for the street-observer, rooms approximate to the forty-second floor, for example would circulate, though removed from sight behind the building's covered edifice (3.148). If seen from a bird's-eye view, the room has four quadrant corners surrounding its central elevator shafts, and this area is broadly divided with modular partitions (3.149). When further imposing music's harmonic progression, sections of the room are required to rise or fall by scalar intervals, although practicality has dictated a level flooring for Chrysler's occupants amid professional business (3.150).



Figures 3.146, 3.147, 3.148, 3.149

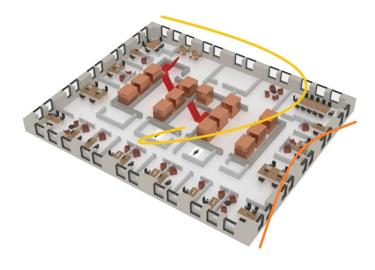


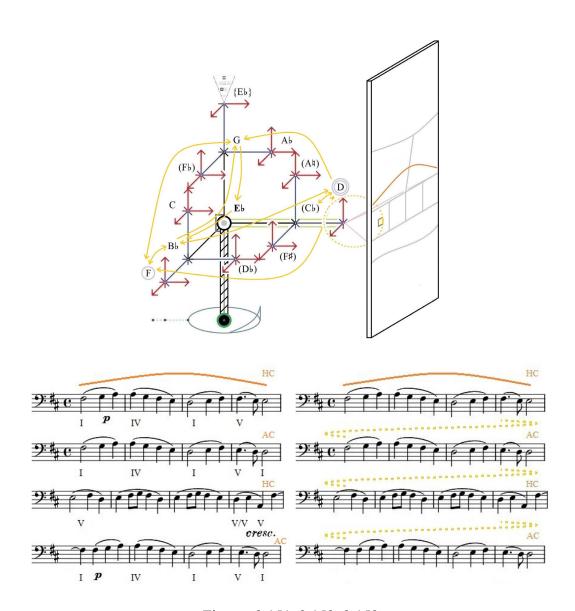
Figure 3.150

W.ii. Coordinated sequence ii

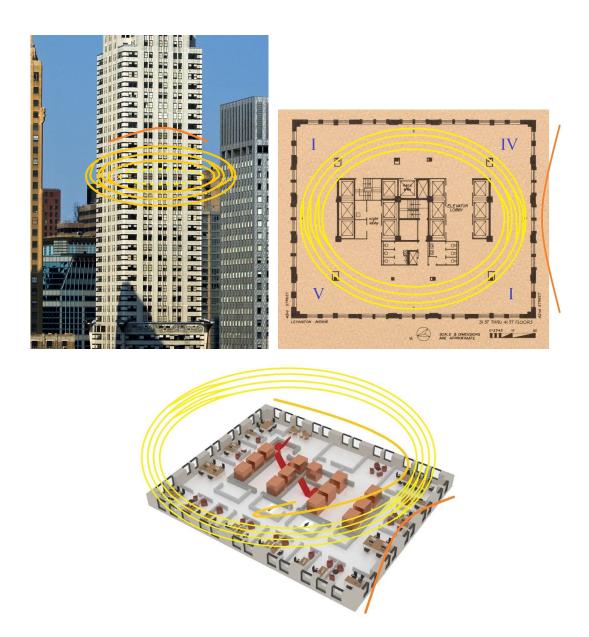
As our study of "Ode to Joy" advances, we're able to enlarge this excerpt of harmonic progression from Symphony No. 9 with multiple cadences, and thus four phrases which are grouped into a formal period (3.152). As similarly discussed under Theory 2.2.1.1, the reading of a musical score involves a person scrolling their eyesight over the written page, while imparting the illusion of sonic notes moving across and downward on paper (3.153). By argument of our mechanical model, though, each measure is rotating and passing by when perceived in a live performance, or in underlying contact with the score when read through emblematic notation (3.151).

Clearly for the Chrysler, there are no rotating floors, but if continuing to draw the parallel from a bystander's view on East 42nd Street, one could imagine a particular level circulating repeatedly (3.154), rather than descending steps in an architectural structure and akin to the aforementioned misapprehension when reading down a musical score. Otherwise from a bird's-eye view again, we see a hypothetical room that spins with the

possibility of "harmonic" variation (3.155), that again would calculate into higher and lower gradients when relating to a grounded base (3.156).



Figures 3.151, 3.152, 3.153

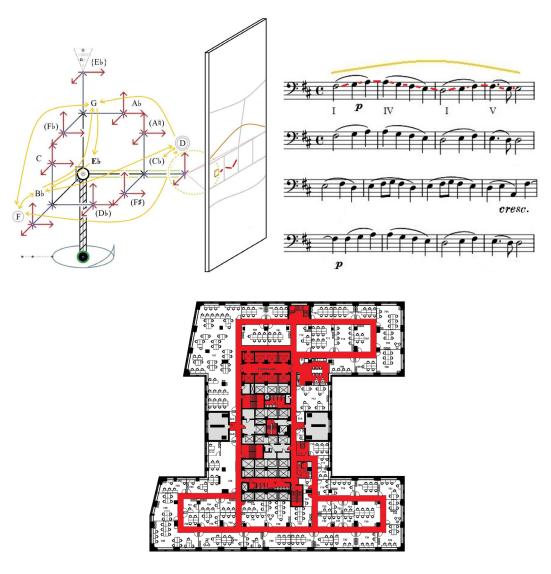


Figures 3.154, 3.155, 3.156

X. Procedural excursion

The "Ode to Joy" has a distinctively conjunct melody, with some deviation by the intervals of thirds and a complementary descending fifth / ascending sixth in m. 12 (3.157). As such, notes would appear to emerge as a sounding trail, again from a rotating chamber in D major (3.158).

Similar to Office Providers, SPACES is a search service for customers who wish to lease office space in a highly idealized environment. The company provides numerous services by contract, including access to meeting rooms and private desks, plus networking opportunities at hosted business events. Likewise with the 7th floor of the Chrysler Building, designer office space is available, where tenants circumnavigate walkways, but without negotiating musical versatility, or an inwardly spinning chamber (3.159).



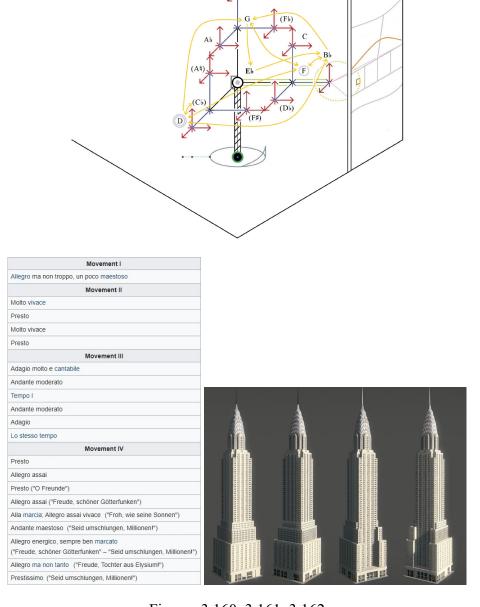
Figures 3.157, 3.158, 3.159

Y. Geometric succession

The formal organization of the 9th Symphony is unique in several ways, since its musical material appears to accumulate gradually across four movements (Fig. 3.161): the first movement is in sonata form, but without a repeating exposition; Beethoven unusually places the Scherzo before the slow movement, just as this second movement adheres to the customary three-part structure of a dance suite (scherzo-trio-scherzo or minuet-trio-minuet) while employing other internal features of complete sonata form; for the third movement, it is in double-variation form, with each pair of variations progressively elaborating the rhythm and melodic ideas; the fourth movement has a choral finale, which is based on the theme of "Ode to Joy" with extensive variations. Timed at nearly 24 minutes, the last movement is unusually long and comparable to an entire symphony within the Classical era. Regarding tonality, the orientation of our model represents a phase of the third movement (3.160), where Bb major is brought to the musical surface between three out of six key appearances. Shifting modestly from D minor in movement two and as shown by Figure 3.135, we can see how the array's primary segments and its third nodes have permutated between Cb & D and F & Bb, Fb & Ab respectively in 3.160 (system core being classified as node 0; Eb tonic as node 1; Cb, F and G tonoi as node 2; C, Db, D, Eb octave, Fb, F\pm, Ab, A\psi, Bb tonoi as node 3; node 4 being terminal and having the potential to attach to the ideal horizon—primary segments defined between nodes 1 and 2, secondary between 2 and 3, tertiary between 3 and termini); though local perception for an audience would be further discussed in Spectrum 5, movements two and three are represented in 3.160's left and right flanks accordingly.

The Chrysler Building weighs approximately 250,000 tons and because of its permanence, versatility becomes a principal factor again when assessing all of it sides. Despite the inaccurate depiction of not having a recessed shaft in relation to Third Avenue in Figure 3.162, we see the skyscraper's southeast/northeast/northwest/southwest sides from the point of view of the circumnavigating spectator.

{Eb}



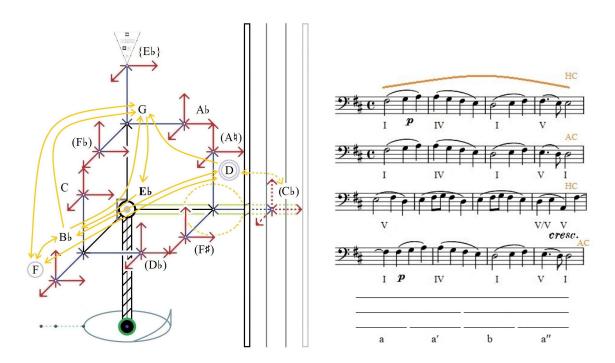
Figures 3.160, 3.161, 3.162

Z.i. Gradual compilation i

As a composer, Beethoven's skill was celebrated both in his time, and by scholars in succeeding generations (Rosen, 379-450). Historically his oeuvre has been divided into three periods, the last of which is characterized by innovation and experimentation, as opposed to developing craftsmanship during his early phase, and a mastery of standard forms during the Classical age for Beethoven's second period. The Ninth Symphony belongs to the third period and as mentioned prior, the fourth movement is set in a theme and variations form. The theme is performed with several instrumental variations, before a baritone vocalist introduces Johann Schiller's lyrical content. Despite the music having up to nine variations, a double fugue, and three Coda figures, we can focus on the deeper organization of "Ode to Joy" by comparing formal phrases and periods. For example, the first four measures comprise a phrase that ends with a half-cadence. The material reiterates through a similar harmonic progression, though ending with an authentic cadence. Because of the similarities between the first two phrases, we can group them into a larger syntactic level; due to similarities between the third and fourth phrases, we can group those into a formal period as well. Syntactically these periods can be sorted into a larger level still, just as the investigating scholar would find multiple levels across other parts of the symphony (3.164). The complex array is able to accommodate deeper levels of tonality, where a third-generation node is retracted by its secondary segment. Our proposed model for the 9th Symphony thus has Cb being subsumed precompositionally, while D major functions in tandem with music's intervening idealized plane. If musical mechanics preside in the realm of the imaginary, our hypothesis maintains that this plane can likewise be subdivided into syntactic motives, phrases,

periods and a movement. Much later during this fourth movement, though, Cb appears and this could be interpreted as the musical system broadening to function artistically in sonic space. We also acknowledge that Beethoven employs B\(\bar{b}\), which counters our case that Eb is the piece's foundational tonic. However, and because of the impracticality of a seven-flat key signature for Cb, accepting the enharmonic equivalent of B\(\bar{b}\) (and its five-sharp key signature) suits the preponderance of our musical argument (3.163).

As seen through SPACES again and in Figure 3.165, open floor plans in the Chrysler can be taken advantage of, where modular walls are arranged to suit various professional purposes. Though succeeding areas might not be necessarily subdivided equilaterally or symmetrically (in parallel to musical syntax) and doors accessing subterranean basements (paralleling tonics) might not occur, groupings can still be made with desk-space occupying a smaller portion of the entire room, for example.



Figures 3.163, 3.164



Figure 3.165

Z.ii. Gradual compilation ii

Advancing into more intricate analysis, Heinrich Schenker published his pioneering study on Symphony No. 9 in 1912 and the monograph divides the topic's discussion into three parts: score analysis, performance prescriptions, and a critical survey of existing literature. While the entire piece is beyond the scope of this section in the dissertation, Schenker did focus on the "Ode to Joy" in Volume III of "New Musical Theories and Fantasies" within his Free Composition (*Der Freie Satz*) by providing a middle-ground reduction with the Ur-satz ([Fig. 109 e 3]; 3.167-168). My continued reductions of the musical sample are slightly different than Schenker's (3.169), who argued for an interrupted descent from ^3 to 2 and 2 to 1 while removing A³ structurally. However, I will assume agreement, if Schenker progressed to a background level and argued that D³ as tonic in measure 8 is structurally supporting the full passage (3.170).

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⁹ Beethovens Neunte Sinfonie: eine Darstellung des Musikalischen Inhaltes unter Fortlaufender Berücksichtigung auch des Vortrages unter der Literatur ("Beethoven's Ninth Symphony: A Portrayal of its Musical Content, with Running Commentary on Performance and Literature as well").

The complex array is able to accommodate deeper levels again, in this case illustrating tonal 'folds' more clearly from music's idealized plane. Though one option could have Cb reposition itself somewhere else in music's hypothetical domain, here its tonic is withdrawn while D major continues to function through each motive, phrase and period syntactically (3.166).

Because the Chrysler has a "tube in a tube" design, where the elevator shafts are central and surrounded by the framework of the building, a parallel can be made to Schenker's concept of deeper units of organization. Since thick interior walls were no longer necessary through steel-frame engineering, room partitions have been given interchangeable sections, so that the floor plan in any office suite can be changed quickly. Thus from the perspective of a viewer on 3rd Avenue, a group can be made initially with filing and reception rooms on the right side of Figure 3.171 (Floor 42), and then proceeding into the central columns—albeit not an exact duplicate to the "Ode to Joy's" reiterated ending and beginning.

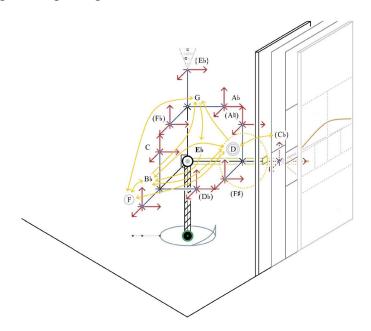
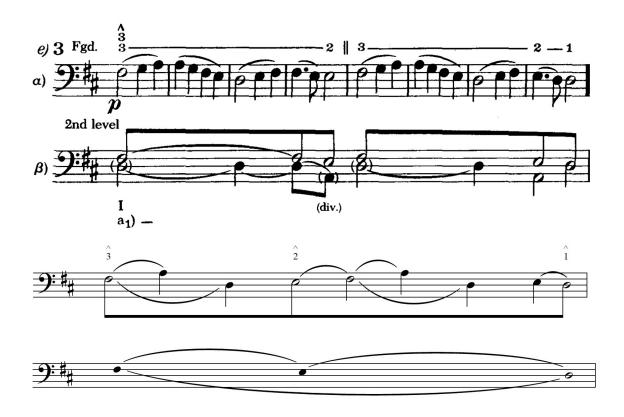
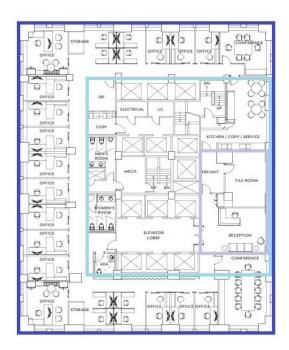


Figure 3.166





Figures 3.167, 3.168, 3.169, 3.170, 3.171

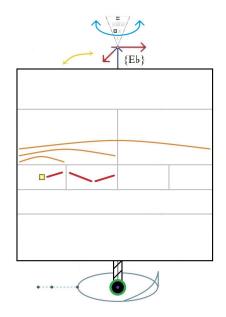
Z.iii. Gradual compilation iii

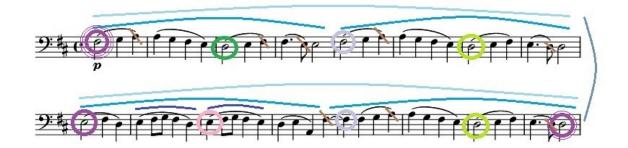
Though our model is presented in a frontal position regarding Figure 3.172, where underlying structure is conjoined with formal edifice, inventive notation can easily represent melodic contour and syntactic levels with musically imposed lines and arcs. Likewise for "Ode to Joy," where global mechanics would support the dynamic placement of all twelve keys in tonality, traditional analysis enjoys the practical benefit of encircling structural notes and binding important passages (including formal motives in mm. 10-11) in a simpler score reduction (3.173).

Inspired by Fred T. Ley's leadership as head contractor, a practice was started of posting the number of stories reached on a placard at the bottom of the Ley Company sign attached to the Chrysler's steel work. 10 Thus after the building's steel frame had been erected to the 12th floor, laying the brickwork by masons began. Ley increased construction speed without compromising safety, by implementing a number of innovative measures. For example, lunchrooms were set up on actively assembled floors, horn signals were used to coordinate sub-contractor teams, and the size of derricks adjusted when transferring steel from the street-level to cantilevered holding stages above. Assembling the walls followed duly behind, however it's interesting to note that proper welding techniques did not yet exist for stainless steel, owing to its highly nonferrous metal content. Because such welding must be done under an inert gas shield, the dome and the ornaments on the Chrysler Building were riveted and their seams were sealed with solder where necessary for waterproofing (3.174).

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¹⁰ Kingston, George C. ("William Van Alen, Fred T. Ley and the Chrysler Building," 170).





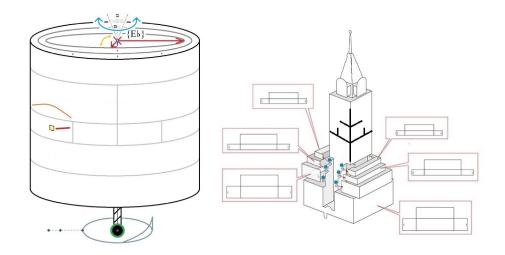


Figures 3.172, 3.173, 3.174

A.2. Multifaceted prototype

Applying a comprehensive view of the complex array regarding the Ninth Symphony, we have exploited a model that has Eb at its first node with other derivative branches (G [node 2]: Ab, Eb octave, Fb [nodes 3]; Bb [2]: C, Db, F [3]; D [2]: F#, A, Cb [3; Figure 3.124]). The extent to which its internal mechanics are obscured by formality's outer edifice remains a topic of future discussion, however it could be dependent on what preparations are made for purposefully directed operations, a topic properly reserved for Spectrum 4 and succeeding tables (3.175).

With credit given again to Metal Earth, a model of the Chrysler is assembled using parts cut out from high-quality steel sheets. In this diagram, flat pieces are manually folded through insertion tabs to corresponding holes, however its casing affords the opportunity to hypothetically represent an arrayed internal structure (3.176). Though not exact to the Chrysler's structural design, Legoland's Miniland USA 2018 further represents the building's interior through 55,500 Lego bricks at 3.59 meters tall. Still at 350 hours to construct, here we see a simpler supporting cross-section, set within the square perimeter's columns (3.177). Whereas Miniland is a miniature park in Lego form, Legoland Windsor Resort, as 2018 host, is a unique theme park where families can explore model building workshops, as well as installations, attractions and interactive rides on 150 acres of parkland.





Figures 3.175, 3.176, 3.177

B.2. Actionable organon

For the last stop in this chapter, we see that the tonal model of Symphony No. 9 is manipulated by acoustic instruments (Table 3.4). When considering versatility, it can be argued that a violin held by the seated performer remains in a relatively fixed position as musical sound "spins" by (3.178), in contrast again to empowered tools that would have to move around the Chrysler, for example. Beethoven's orchestration for the 9th Symphony otherwise had the largest forces required for any of his symphonies, including four horns and at the premiere, the composer assigned two players to each wind part.

Similarly led by conductor Gustavo Dudamel, the Simón Bolívar Symphony of Venezuela, the Simón Bolívar National Choir, and soloists Ámbar Arias (soprano), Marilyn Viloria (mezzo-soprano), Jesús Herrera (tenor), and Jonás Yajure (baritone), all perform in this concert held in the Greek Theater at University of California, Berkeley, in 2015 (3.179). The Simón Bolívar Symphony Orchestra of Venezuela represents the apex of the nation's system of youth orchestras that were supported by El Sistema (*The System*), a publicly financed music-education program that was founded in Venezuela in 1975 by Venezuelan educator, musician and activist, José Antonio Abreu.

List 3.4: Orchestral instrumentation

Woodwinds: piccolo (4th movement only); 2 flutes; 2 oboes; 2 clarinets in A, Bb and C; 2 bassoons; contrabassoon (4th only)

Brass: 4 horns in D, Bb and Eb; 2 trumpets in D and Bb; 3 trombones (alto, tenor, and bass; 2nd & 4th movements only)

Percussion: timpani; bass drum (4th); triangle (4th); cymbals (4th)

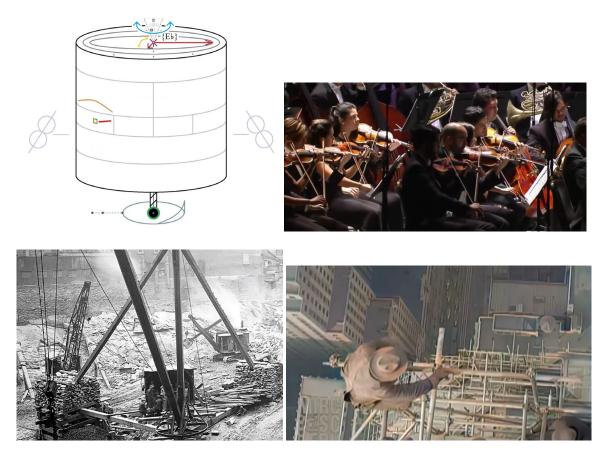
Voices (4th only): soprano solo; alto solo; tenor solo; the original published score specifies a baritone solo, though performance practice often uses a bass; ¹¹ SATB choir (tenor briefly divides)

Strings: violins I & II; violas; cellos; double basses

Hired by Fred T. Ley as head contractor for the Chrysler, the Godwin Construction Company of New York utilized six steam shovels, four multi-ton derricks, 20 hydraulic drills and 40 trucks for hauling away the material that was excavated. At the time, the steam shovel was the most efficient excavation machine on construction sites (3.180), whereas the adaptation of the hydraulic cylinder to construction machinery did not occur until after the Second World War. The subcontractor for erecting the steel itself was Post & McCord from Manhattan and as the building rose, the positioning of derricks changed between the center of the structure and a holding platform cantilevered off

¹¹ Kenneth Woods recognizes and is critical of the opposite trend, where the baritone's part is sung by an even lighter voice, though either practice may be justified when meeting Beethoven's demanding performance criteria ("Nuts and bolts of Beethoven 9–Finding the Fantastic Four").

various setbacks (3.182). For the crown, an outrigger platform was created around the top of the tower, and this provided the support for a guy derrick, or a lifting device consisting of a mast fitted with a boom that was supported by guy wires. On a more intimate scale, footage from Fox Movietone News outtakes shows crewmen working at dizzying heights on scaffolding, which began at the 61st floor and extended to approximately six feet above the spire's finial tip. Known as "Gold Medal Tubelox Scaffolding" while supplied and erected by the Chesebro-Whitman Company, it consisted of pipe sections held together by patented, bolt-together collars that were tightened with ratchet wrenches (3.181).



Figures 3.178, 3.179, 3.180, 3.181



Figure 3.182

4. CONCLUSIVE EVALUATION

4.1 Deductive Corollary

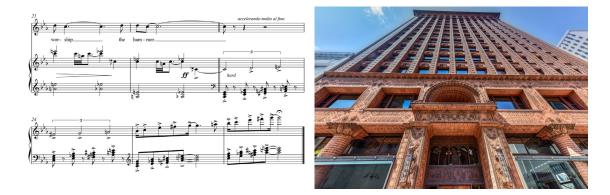
As stated previously in Chapter 1, comparing artistic subjects is far from new, particularly in recent decades with the onset of multi-disciplinary studies in leading academic institutions. For those researchers interested in music though, one's study may have been hindered due to the intangible and invisible nature of sound. Architecture became a logical choice for conceptualizing music and this was often accomplished through metaphorical language, and yet for the more technically minded, systematic correlations had not been formally developed. Subsequently when applying functions from analytic Spectrums and their methodical levels within the complex array model, the author of this dissertation hopes to have offered a meaningful contribution to the academic canon appropriately.

4.1.1 Interpretive Distinctions

Having compared examples of music and architecture, with sculpture as a mediator between these two particular performing and static arts, we see an important trend emerge, and that is the concept of versatility. Formally defining the idea as "a fixed or mobile viewpoint of the spectator in relation to a work of art," this attribute became most pronounced when first related to the elements of tempo and dynamics. Thus as described in 2.2.2.1 (Spectrum 2 I.1.A.iv) and for music, a slower speed implies a larger circumference for the pedestrian to circumnavigate concerning architecture; i.e., the slowest metronome marking in Beethoven's Symphony No. 9, 60 bpm, can be found in

both the third and fourth movements and for the Chrysler, the largest perimeter is naturally found at the base.

This raises an intriguing point, since it is commonly found in the classical symphony that the second movement of four has the slowest tempo and gradually accelerates until the end of the whole piece, as the final of other concert styles might do (Figure 4.1); in parallel, many buildings peak at their top, if not for practical reasons such as water or snow removal, but also for aesthetic rationale, such as a cathedral being adorned with ornate steeples. If reversing the parallel from architecture, the base of a building, where visitors most commonly enter, regularly is the largest, and this can be explained through practical reasons, such as foundational support. We thus would expect music to start with its slowest speeds, although classical symphony conventions disprove that imperative and its most viable explanation would be that art often seeks to dramatically capture one's attention at the onset of a related experience. If recognizing that architecture, as an applied art, is comprised of both pragmatic and aesthetic values though, this could partially explain why ground levels for the discerning visitor frequently have "busier" embellishments to view and appreciate (4.2).



Figures: 4.1 "The Hammer" by Gary Bachlund for medium voice and piano (2008); 4.2 Guaranty Building, Louis H. Sullivan (Buffalo, 1896)

As for volume and described in 2.2.2.1 (Spectrum 2 I.1.C.i), a louder sound in music, again suggests a bigger circumference for the spectator to negotiate concerning architecture: fortissimo is the loudest dynamic marking in Symphony No. 9 and not unsurprisingly, is found at cadential moments, including the final measures of the first movement; the base floors of Chrysler are again the widest and contract in a "wedding cake" fashion when ascending, owing directly to New York City's 1916 zoning, which aimed at preserving space for light to reach the street-levels below.

Interestingly, this fact counters our prior deduction when noting how spires don many constructions (4.4) and if music were converted, one might anticipate softened activity at the end of a piece. But this is not an absolute, as shown in the Ninth Symphony, or in the fourth movement of Brahms' fourth symphony, where m. 291 has a double-forte in the score with multiple succeeding sforzandi (4.3). Again, this dynamic can be attributed to dramatic influence for music, while for architecture, the profound contemplation of spiritual ascension appears to be of significance when "lightening" one's striving toward a more celestial domain.

If equating the beginning of a musical piece with the "front-piece" of a musical score, entrances and exits assume greater importance in architecture and would seem to be an extension of versatility, although its proper investigation belongs to Spectrum 5 regarding historical context, and how its human members effect the artistic model. Having viewed these points when concerned with Spectrum 1, commentary can be added to versatility, after discussion regarding Spectrum 2 next.

¹ In his "Power in Buildings, An Artist's View of Contemporary Buildings" (52), Hugh Ferriss uses this term to describe a building's "three dimensional envelope," in contrast to the "clean-cut slabs" of the Lever House in New York and what became known as the International Style, when designed by Bunshaft and de Blois of Skidmore, Owings & Merrill (SOM), for example.





Figures: 4.3 Symphony No. 4, Movement IV, Johannes Brahms (1886); 4.4 United States Capitol, William Thornton (Washington, D.C., 1962 last extension)

Moving into the stylistic language of coordinated sequence (2.2.2.2, W.i and ii) and geometric succession (2.2.2.2, Y), we find another aspect concerning versatility and that is harmonic progression. Interestingly when considering how its "passing by" appears to fit music's interior mechanics, the "conversion" of this movement does not seem to translate in the same way concerning architecture. If an aficionado were to likewise visit a building, encircling the premises wouldn't solve the issue since the situation seems to require a shift into the imagination, or where its structure is moving physically. As motorized tracking becomes more practical, this advanced technology in modular homes has become more common, yet the arrangement typically works with whole structural blocks, rather than interior rooms. This precondition otherwise seems to "elevate" each subject philosophically, and thus would serve as corroboration to our

² Given allotted page margins, sforzandi occur between select orchestral sections and in mm. 295 and 301, but they are not included within this diagram (transcription by J. Wilson, *Musescore*).

original argument that architecture properly belongs to the applied Arts, while music should be categorized within the fine arts.

Lastly, the concept of versatility was contemplated on by editors at the Populyst in their article, "Architecture by Walking Around" (prg. 7), although they focused more on a mobile sensory experience, or what authors termed the archsense, rather than "flipping" between the performing and static arts. For example, "The phrase 'management by walking around' became popular in business circles in the 1980s and 1990s. It meant that a corporate manager at any level, even the CEO, should not just manage from his distant marbled office at the top of headquarters but should walk around the office, the factory floor, the store, holding impromptu conversations with co-workers, suppliers, customers etc. This idea of managing on the ground instead of managing with a detached mindset could also be applied to architectural design and to architectural critique. (Great architecture thus) requires the assessment of a building through several senses, not only the visual one. Good architecture appeals to all of the senses, not just to the sense of vision. The other senses are touch, smell and hearing. We can exclude taste for obvious reasons but we should on the other hand add another sense, call it an archsense, that is a sense of light and space, an intangible feeling of well-being or of mild oppression."

4.1.1.1 Potential Ramifications

As previously stated concerning versatility, music would seem to have internal "spin" while for architecture, perceiving the "progression" of its features requires external circumambulation. By extension, how a musical piece starts and finishes or how

a visitor enters and exits a building assumes greater significance, though analyzing such functions appears to be contingent upon the interaction between art and humankind. Reflecting back to our Spectrum Catalog (Table 2.4) and Table 5 regarding Historical Context, the Modes of Communication involve the conditions of "who/when/where," and here is where the topic of "penetrating" both musical and architectural subjects is addressed. This situation includes the roles of composer, performer and audience, of venues and location, and though intriguing aspects to consider, it's evident that additional functions of the catalog remain, when wholly comprehending art. The author hopes to pursue this for future research, alongside Tables 4, 6 and 7, while such topics will hopefully be of interest to other working scholars.

One other aspect of this study and that which I believe to be important, is the application of the complex array model. Whereas some of the more obtuse functions in music theory might be visualized analytically, this system could also be used as a tool during creative composition. Thus, when appropriating Schenkerian concepts³, one can establish the background structure of a piece and then flesh out middle and foreground material, alongside dramatic premises to create authentic interest. It's possible with further exploration, that aspects of Riemannian theory might be translated into this method, if grounding its Tonnetz with a tonal base and seeing triadic transformations as those which might govern the model's mechanics, for example. As a more radical argument, one could even "mitigate" dodecaphonic serialism as an early expression of the

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³ Allen Forte in "Schenker's Conception of Musical Structure" (22) asserts that Schenker meant his theory to be strictly used for analysis. Silberman, however, claims that no statement is made to that effect ("Teaching Composition Via Schenker's Theory", 295) and Rink ("Schenker and Improvisation", 2) further demonstrates how Schenker's notion of improvisation, or letting the *Ursatz* guide creative writing "as a guardian angel watches over a child" (*Free Composition*, 18) can be used as a methodical approach during musical composition. Interestingly when coinciding with autochthonic theory, that Schenker attributed finer musical creativity to talented, yet ineffable genius.

complex array, but with very different stylistic language in the hands of historic composers. The author himself has employed this Schenker-influenced technique in 2003 through a tonal piece for woodwind quintet, for example (4.5), although I trust that the ingenuity of artists will continue to find ways to excite the imagination, be it with these presented ideas, or in other ways yet undiscovered.

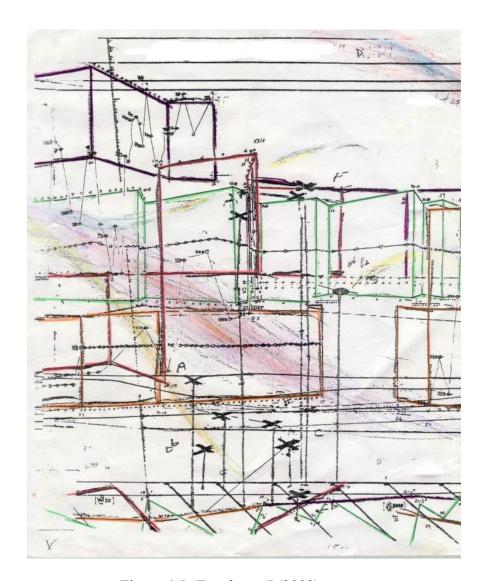


Figure 4.5: *Tonalitem*, I (2003)

Finally and as originally stated when establishing our analytic Spectrums, systematically drawing theoretical functions between architecture and music may be considered to be of pioneering significance. Time will tell if the ideas of this dissertation contribute to the greater academic canon, but when returning to philosophers who have spoken metaphorically about the relation between music and other arts, I would like to expand upon Schelling, Goethe and Schopenhauer's famous aphorism by saying that "Architecture is muted music, and music is sounding architecture."

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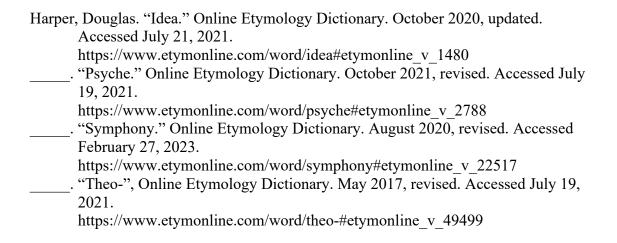
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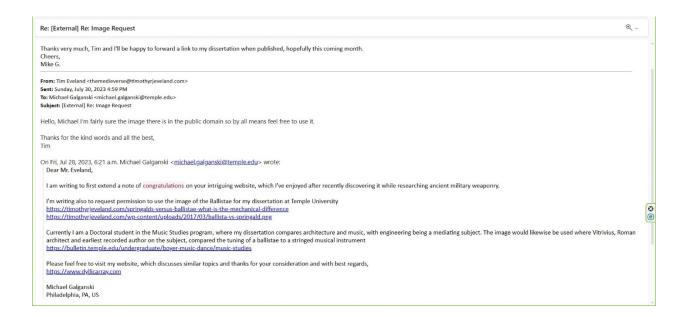


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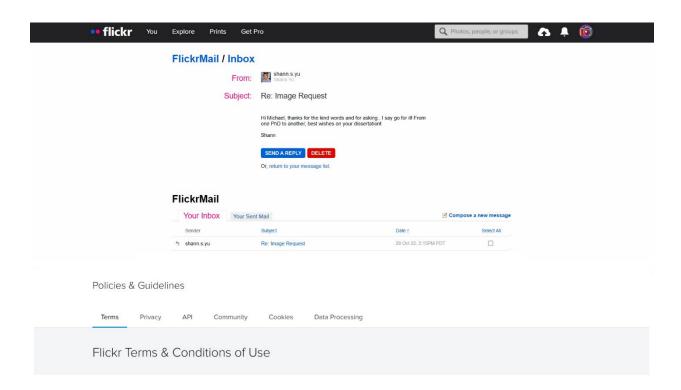
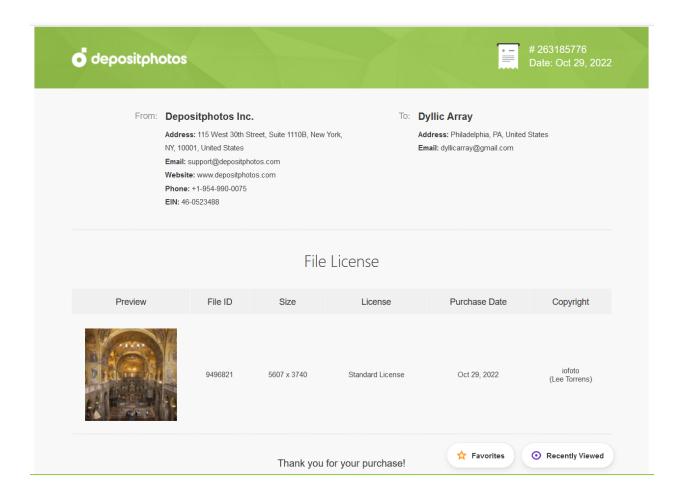


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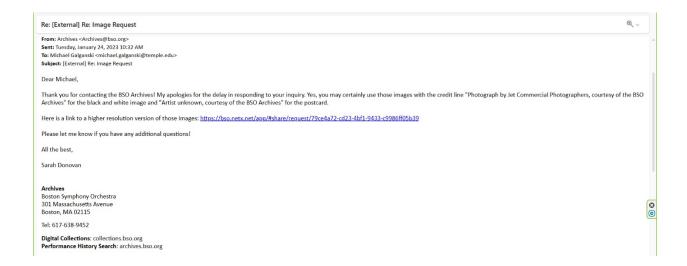


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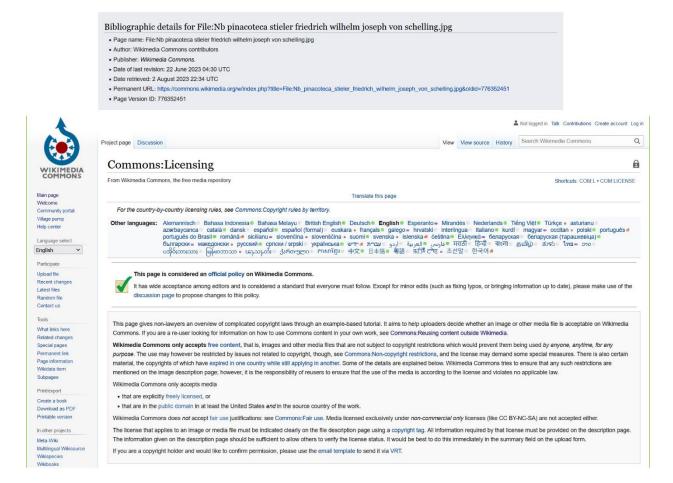


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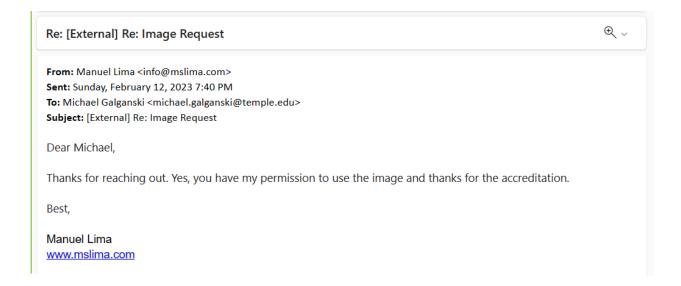
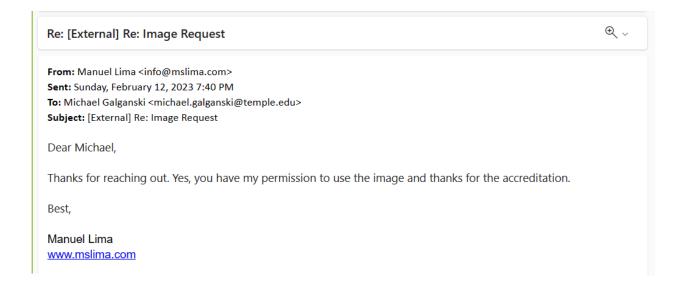


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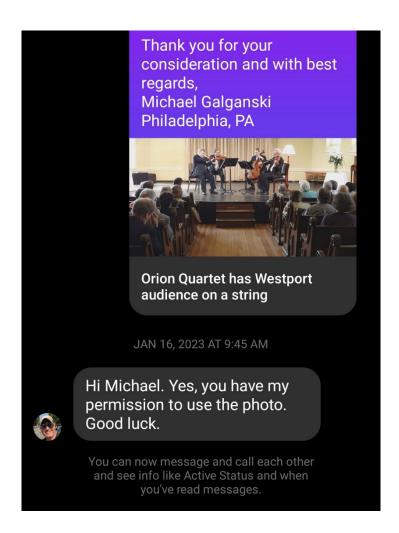


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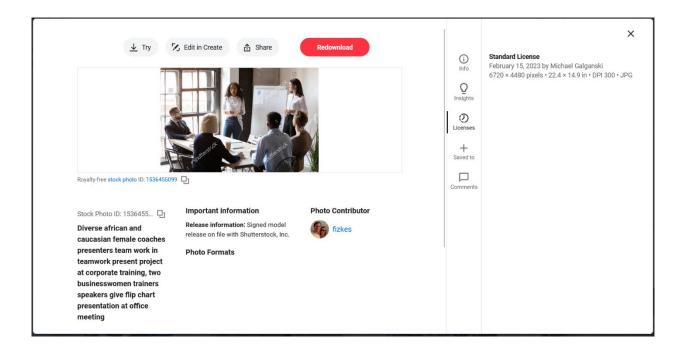


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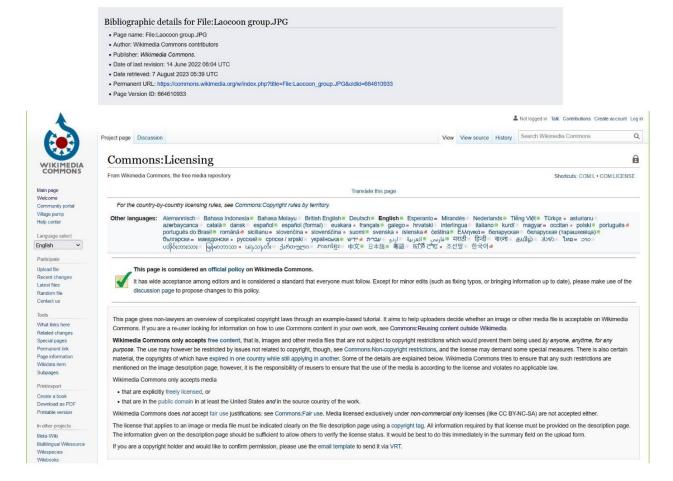


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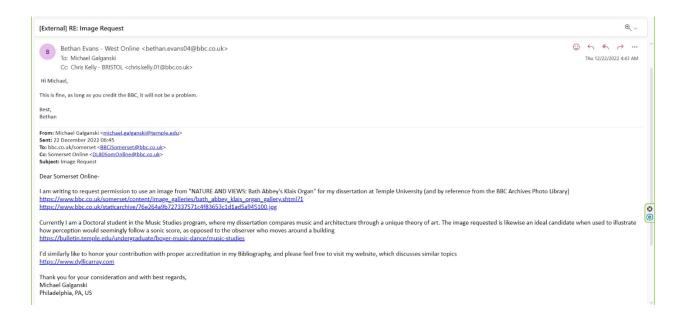


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APPLICANT

Applicant	Michael Galganski Temple University
Contact Information	280 #3 West Walnut Lane Philadelphia PA 19144 USA array@temple.edu Phone 484-358-1968 Fax

PUBLICATION

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Type of Publication	Book/Magazine/Periodical interior
Title of Publication	Constructing An Architectural Model of Music: A Comparative Study of Beethoven's Ninth Symphony and Van Alen's Chrysler Building
Publisher	Temple University
Author	Michael Galganski
Date of Publication	Spring 2023
Print Run	NA NA
Languages	English
Distribution	USA
Website Term	NA NA

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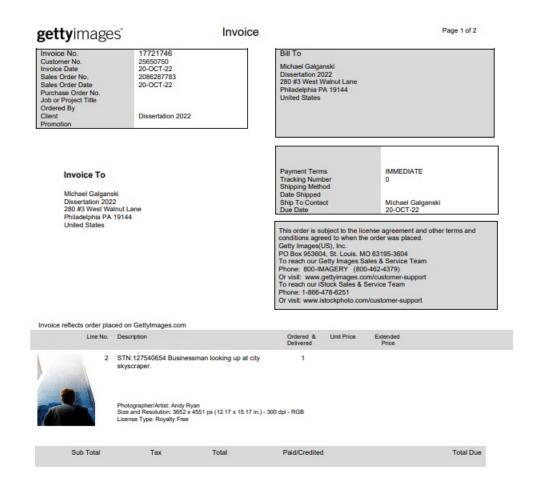


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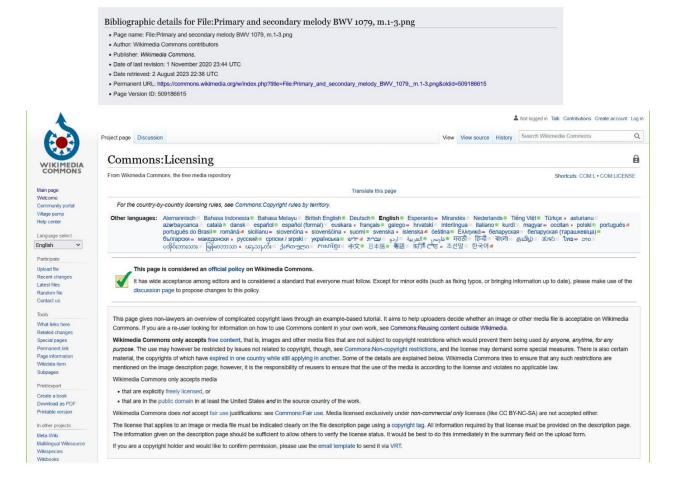


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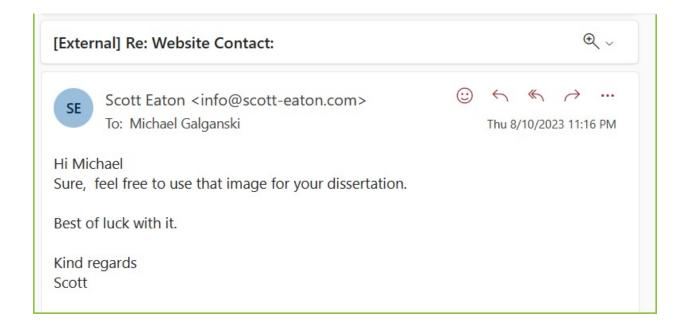


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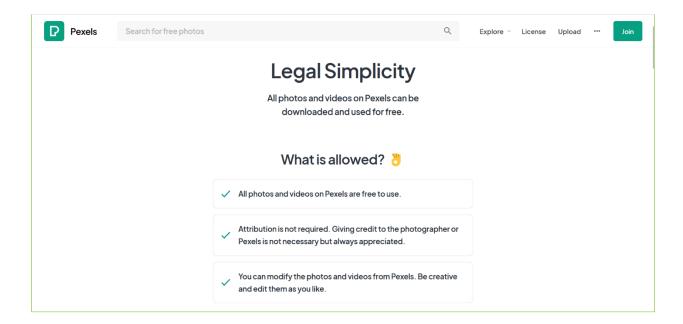


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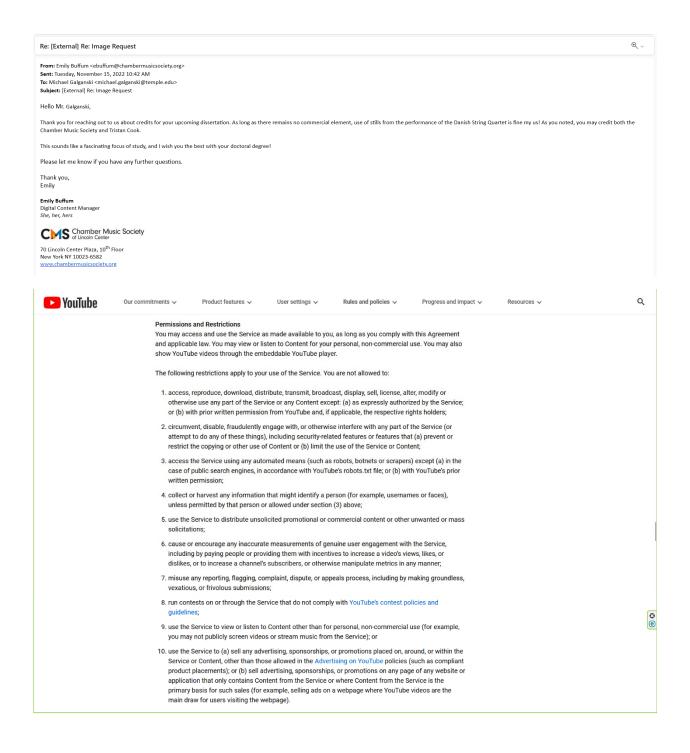


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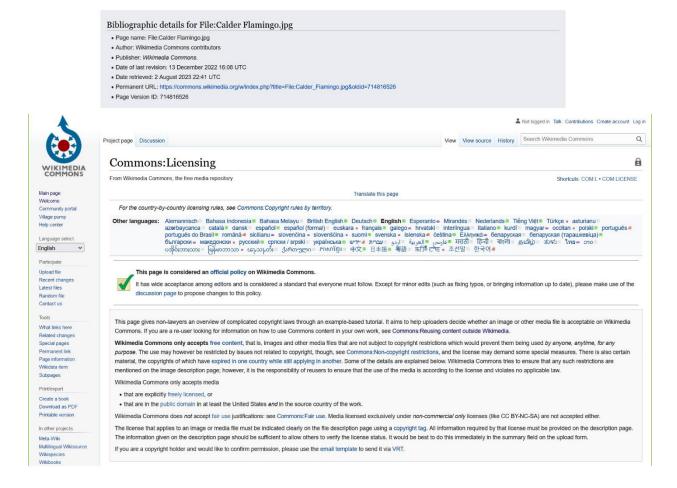


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From: Michael Galganski < galganski.music.array@gmail.com >

Sent: Monday, November 7, 2022 9:30 AM To: Hannah Duncan < hduncan@romtec.com> Subject: Re: Romtec Photo Usage Request

Thank you very much, Hannah.

I can forward an excerpt when completed also, if of interest.

Sincerely and best wishes ahead, Michael Galganski

On Mon, Nov 7, 2022 at 11:28 AM Hannah Duncan < hduncan@romtec.com> wrote:

Michael,

I received your request and you have our permission to use our photo in your dissertation.

Sincerely,

Hannah Duncan

Marketing and Communications Director (541) 496 - 3541 hduncan@romtec.com









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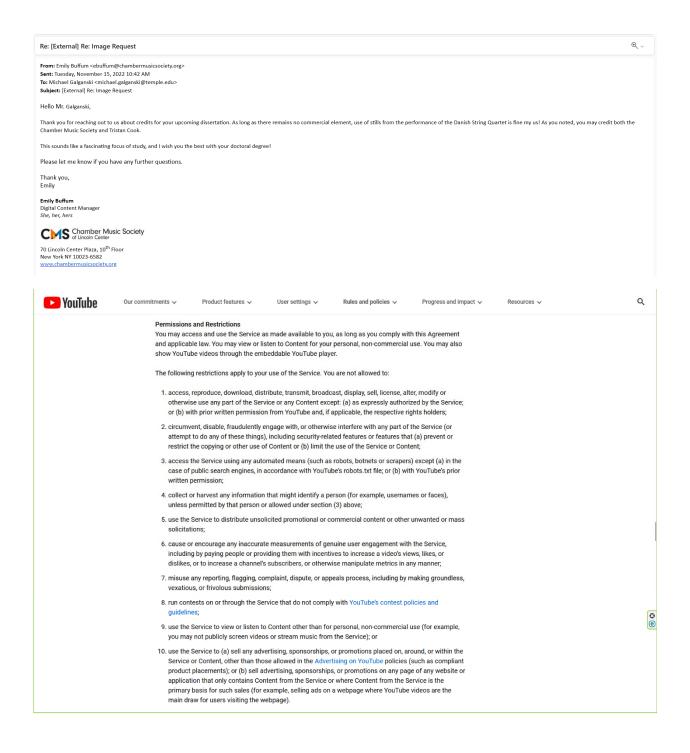


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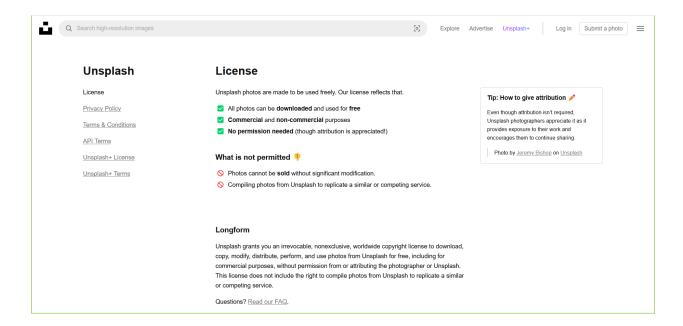


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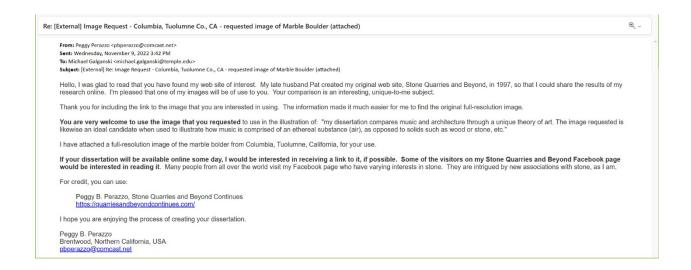


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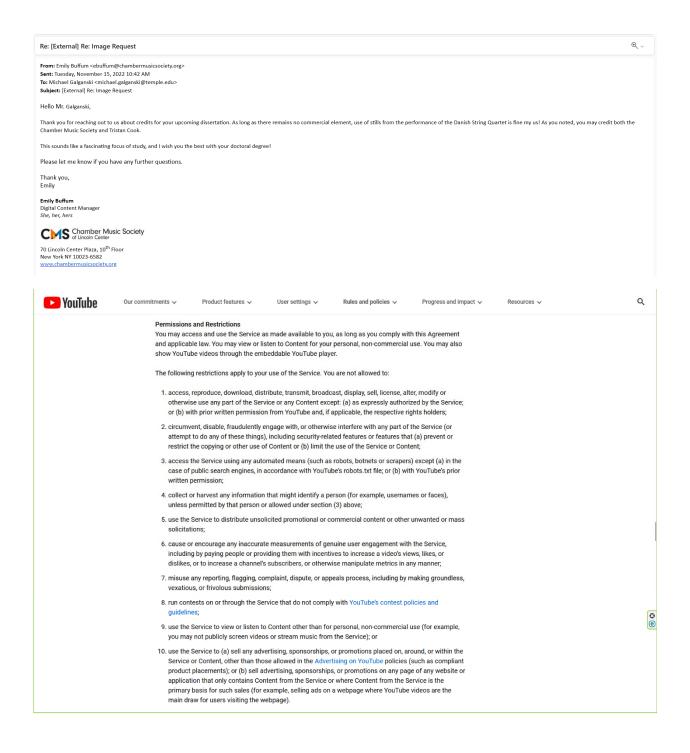


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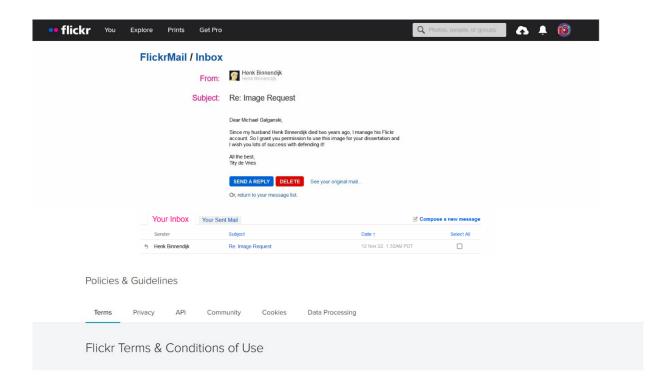


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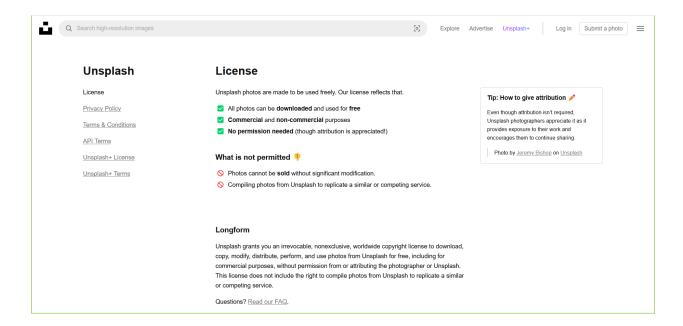


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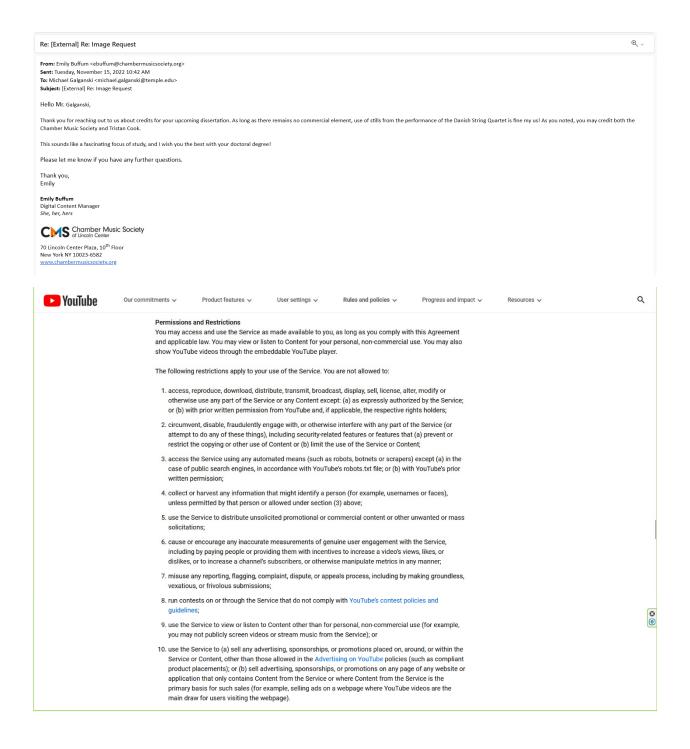


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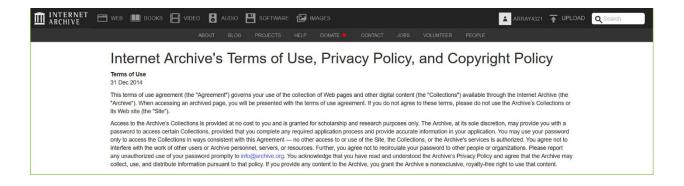
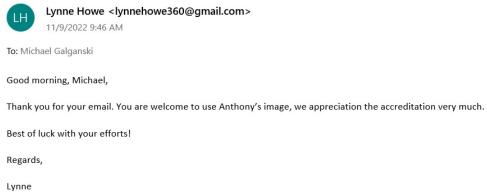
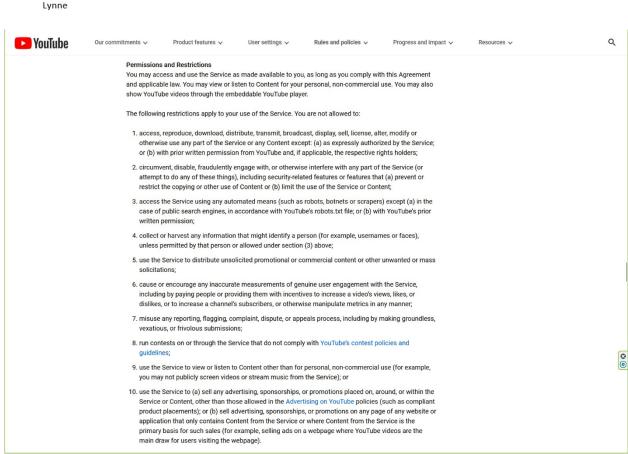


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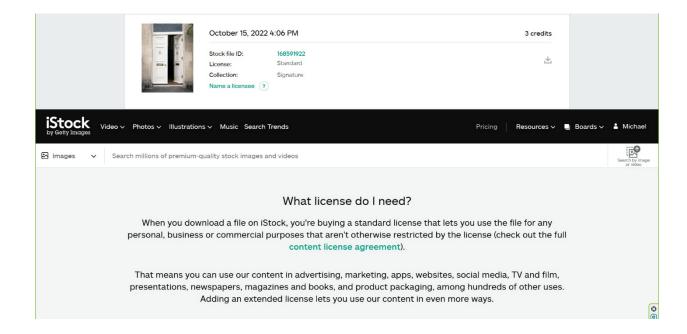
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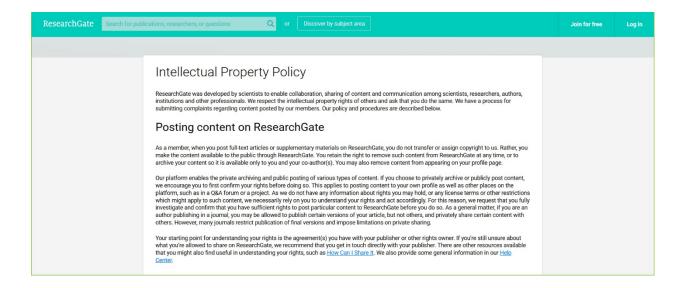


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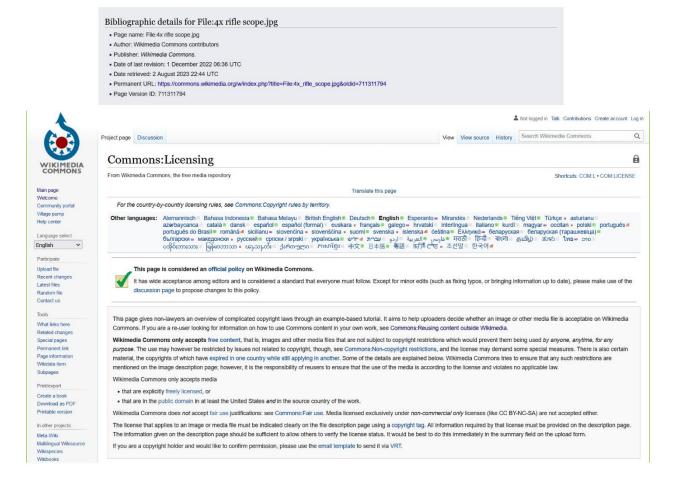


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12:02 PM

To: galganski.music.array@gmail.com

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Good luck with your dissertation!

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Date: 07/31/23 08:22 pm

To: Woodland Customer Service (websales@woodlandscenics.com)

Subject: RE: WebSales - WS - Michael Galganski - SR

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R. Vergnet <contact@organscore.com> to me ▼

Mon, Nov 14, 2022, 8:52 AM

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With my best regards,

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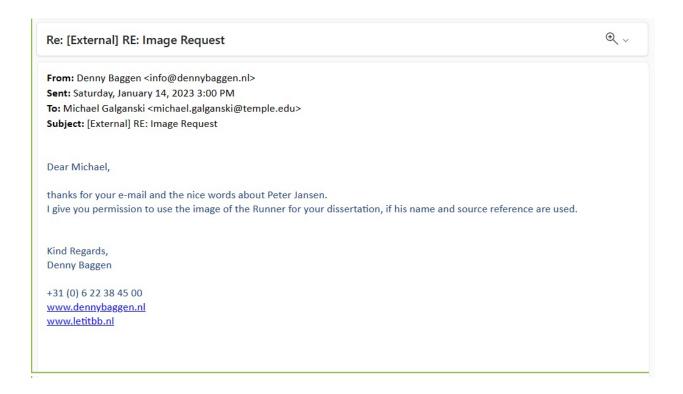


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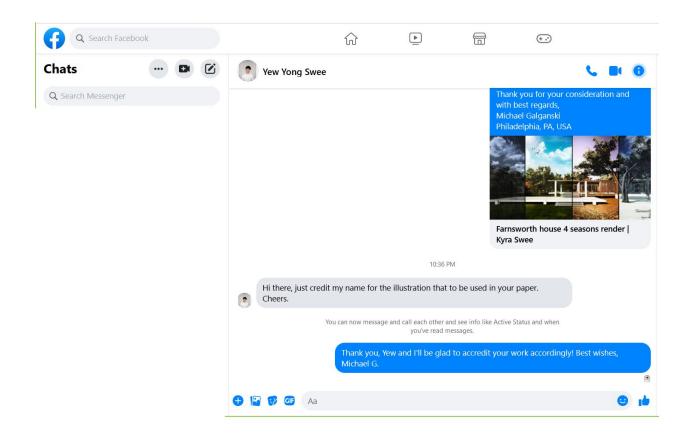


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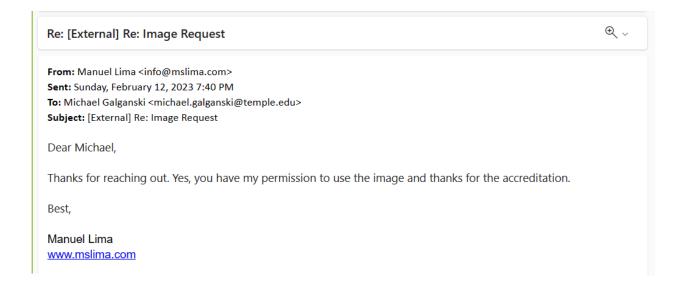


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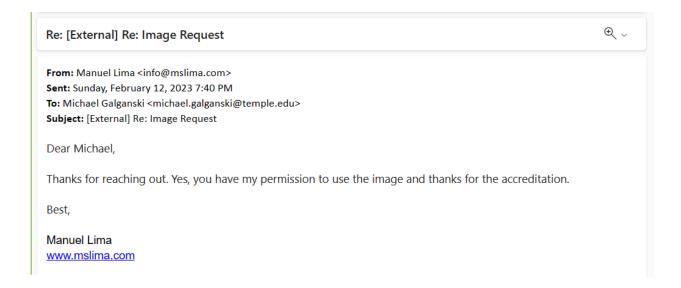


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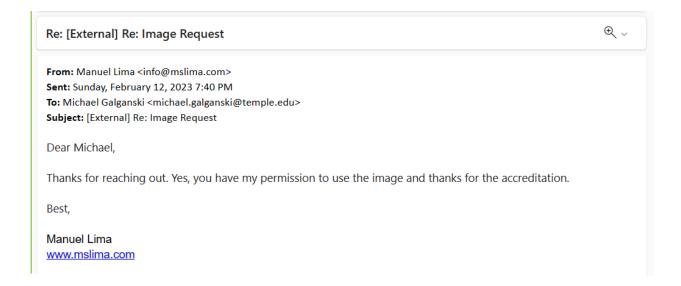


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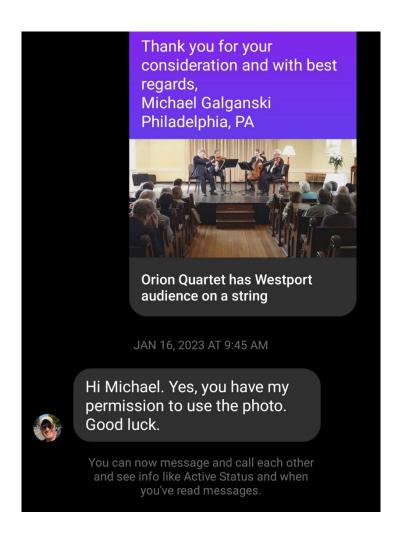


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Thanks and best of luck on your dissertation.

Best regards,

JE

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From: eBay - skeetnscoot

Sent: Tuesday, August 8, 2023 6:33 AM

To: dyllicarray@gmail.com

Subject: Re: arrayarra sent a message about Postcard Merchants' Old Stock Exchange 3rd & Dock Street Philadelphia Pa. *A1498

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Reply

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Re: Image Request



Ben Hollis <ben.hollis@gmail.com>

11/12/2022 1:20 PM

To: Michael Galganski Cc: team@numbera.com

No problem, go for it!

-Ben

On Nov 11, 2022, at 7:55 PM, Michael Galganski < salganski.music.array@gmail.com> wrote:

Dear editors,

I am writing to first extend a note of congratulations on The Method Behind The Music, which I've discovered and have enjoyed viewing online after researching conducting.

I'm writing also to request permission to use an image from your website entitled, "Conducting: Advanced Patterns" https://method-behind-the-music.com/conducting/images/legato-baa95cdc.png

Currently I am a Doctoral student in the Music Studies program at Temple University, where my dissertation compares music and architecture through a unique theory of art. The image requested is likewise an ideal candidate when used to illustrate how the beat in music may parallel the pounding of columns in architecture https://bulletin.temple.edu/undergraduate/boyer-music-dance/music-studies

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https://www.dyllicarray.com

Thank you for your consideration and with best regards, Michael Galganski Philadelphia, PA

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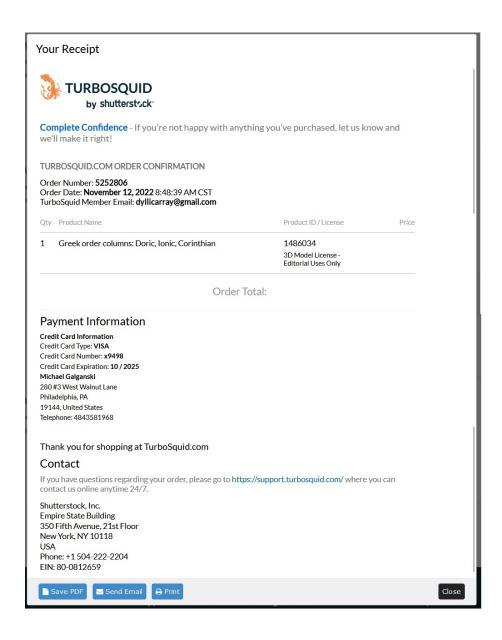


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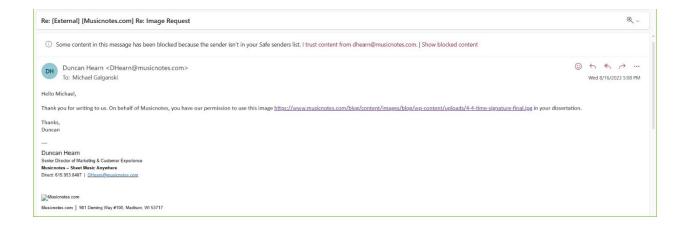


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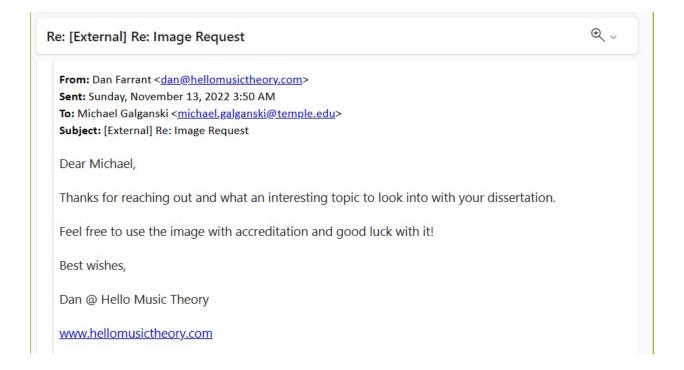


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Re: Image Request



John December < johndecember@gmail.com>

11/13/2022 7:24 AM

To: Michael Galganski

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Best wishes in your work.

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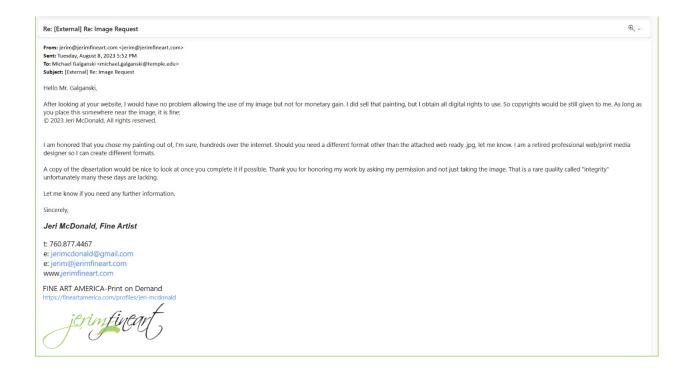


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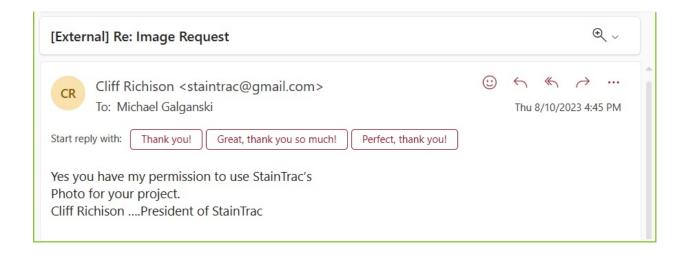
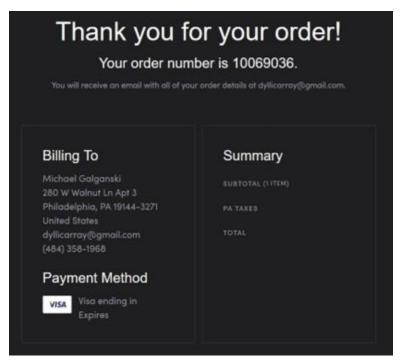
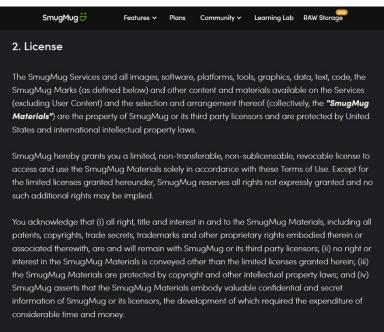


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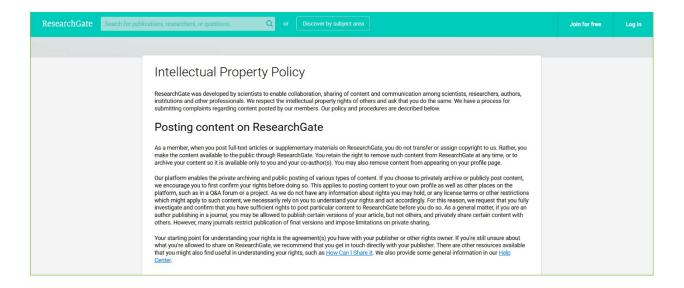


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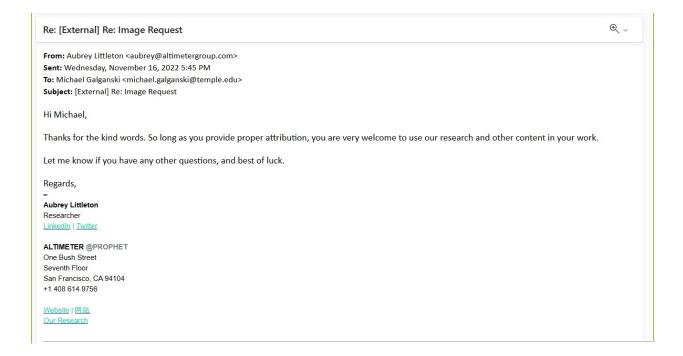


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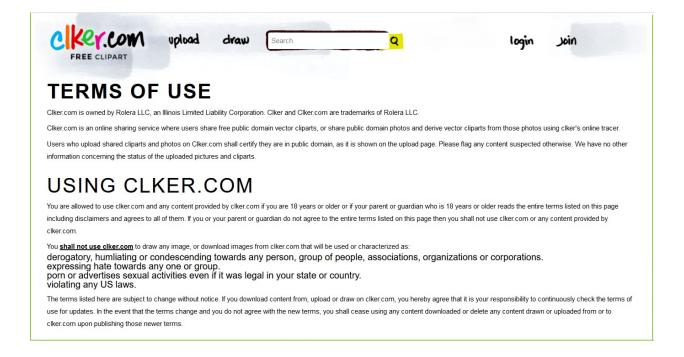


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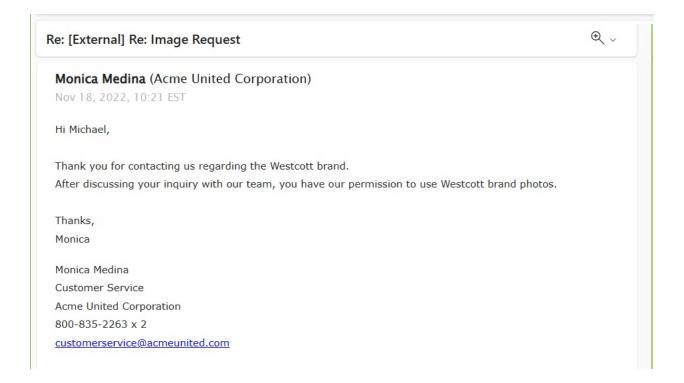


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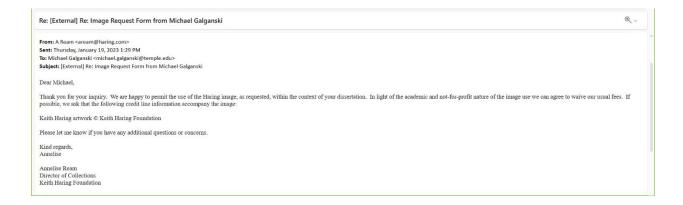


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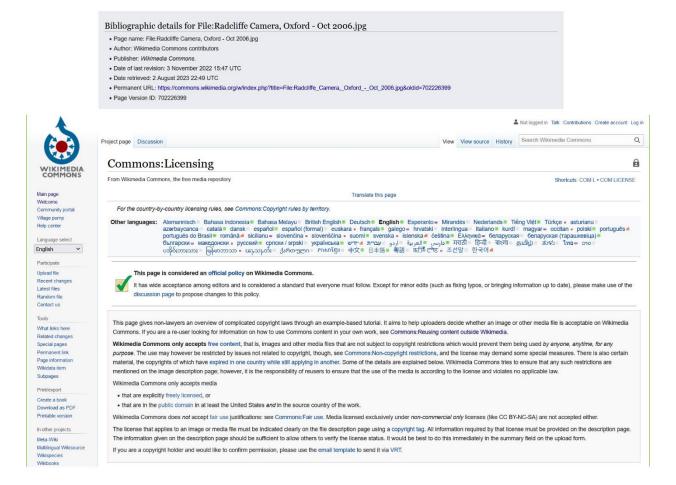


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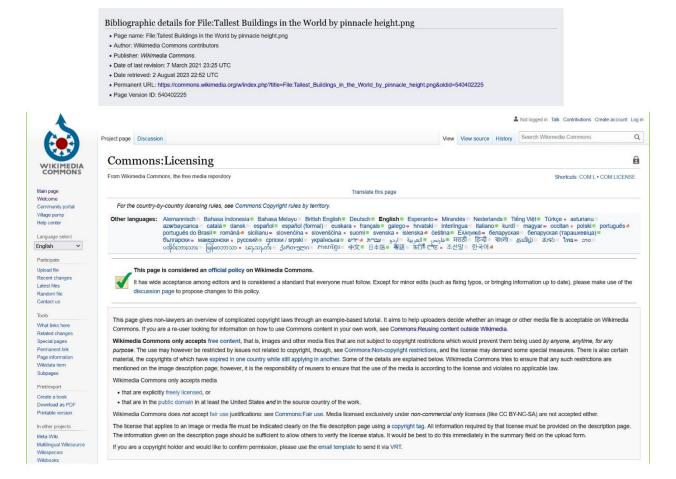


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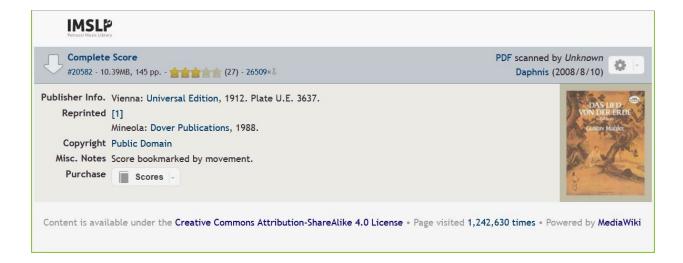


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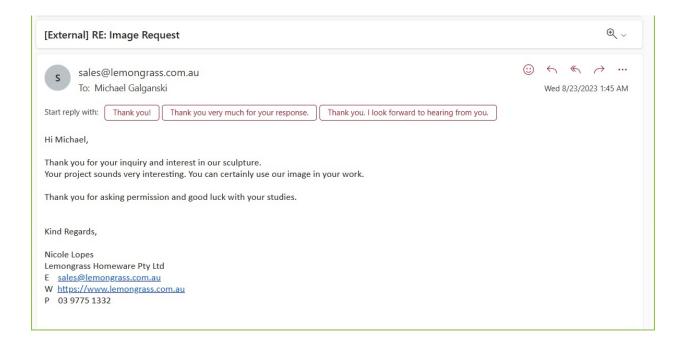


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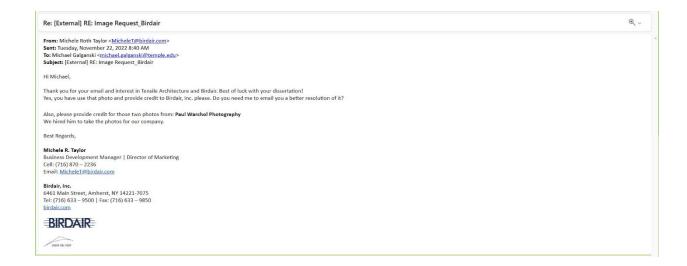


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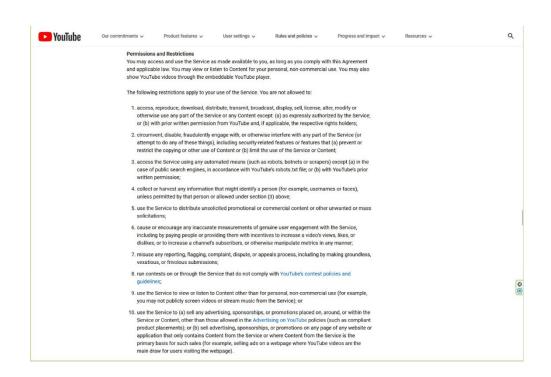
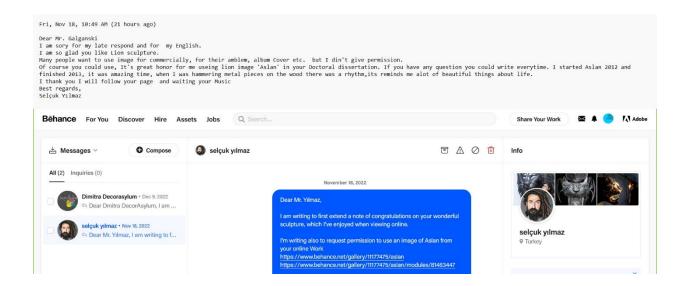


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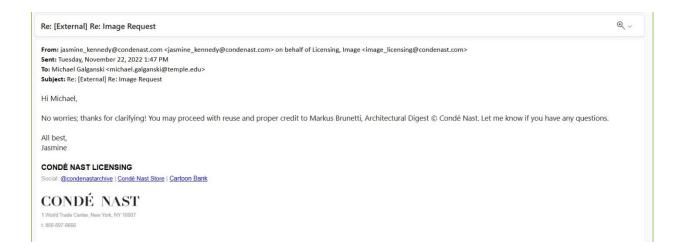
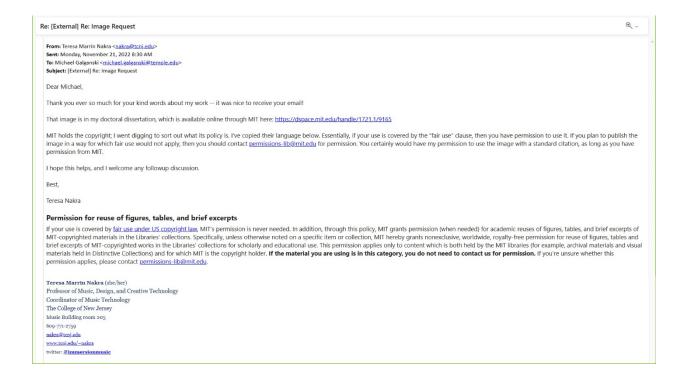


Figure 2.81 image reproduced from Teresa Marrin Nakra's "Inside the Conductor's Jacket: Analysis, Interpretation and Musical Synthesis of Expressive Gesture," Figure 21 (P1's crescendo-decrescendo pairs in the right biceps).

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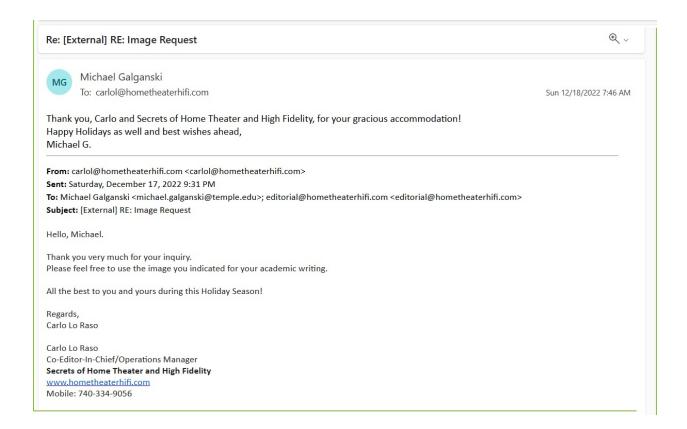


Figure 2.83 image reproduced from Anton Paramonov's photographic archive. © *Alamy*, Inc., Brooklyn, NY, USA.

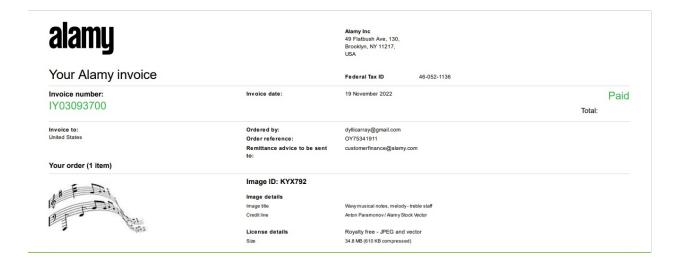


Figure 2.84 image reproduced from Wayne Chisnall's "Happy Valentine's Day Folks."

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On Tue, Nov 22, 2022 at 5:47 PM Wayne Chisnall <<u>waynechisnall@yahoo.co.uk</u>> wrote: Hi there Michael,

Apologies for the late reply - I sometimes neglecte to check my emails as regularly as I probably should.

Thank you for your appreciation of my work.

Yes, by all means feel free to use any images of my artwork in your dissertation.

If you decide to publish the dissertation online, once it's finished, please send me a link; I'd love to see it.

All the best with your dissertation - I hope that it goes smoothly.

Cheers,

Wayne 🗼

waynechisnall.blogspot.com

Instagram.com/WayneChisnall

Twitter.com/WayneChisnall

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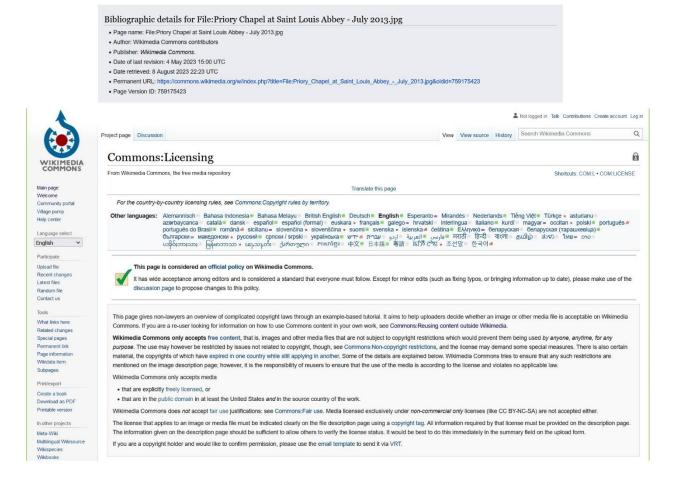


Figure 2.86 image reproduced from Stephen Malinowski's "Voice Tracker–Visualizing the Singing Voice."

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Re: Image Request



Stephen Malinowski <stephen@musanim.com>

11/19/2022 2:13 PM

To: Michael Galganski

At 10:27 AM 11/19/2022, you wrote:

... I'm writing to request permission to use the image from your Voice Tracker > Music Animation Machine in my written dissertation

www.musanim.com/mam/hist22.html

The image would be ideal to demonstrate how musical tone and its spectrogram can parallel architectural surface. As before, I'd be happy to accredit your work in my Bibliography and can send you a link to my publication when completed.

Hi Mike,

I'm very particular about how my animated graphical scores are used, but for static images, I allow any and all uses without restriction, so there's no need to ask for permission (though of course I'm always interested to know how they're being used, so I appreciate that you'll send a link).

For the Voice Tracker, the link you sent has the best images, but for your bibliography, you might want to also include this page ... http://www.musanim.com/mam/vtframeset.html... which has more explanatory text.

Best regards,

Stephen

Figure 2.87 image reproduced from Richard Beasley, Paul Bourke, and Paolo Di Pasquale's "CHROMOSCALE. Unique Language for Sounds Colors and Numbers" (2022).

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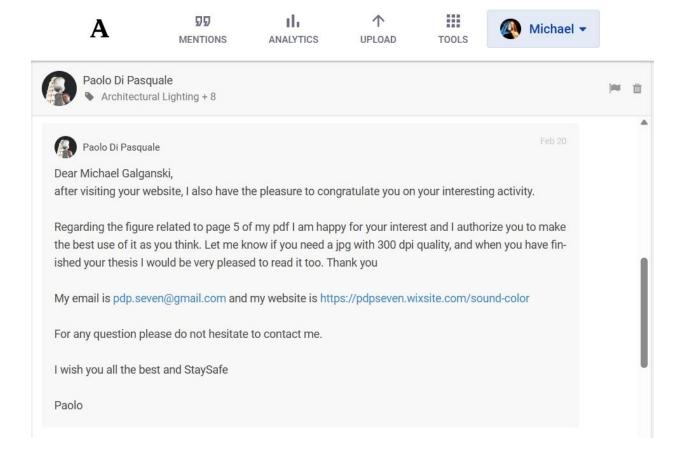


Figure 2.89 image reproduced from Jürgen Lingl's "lioness, wood." © *Bored Panda*.

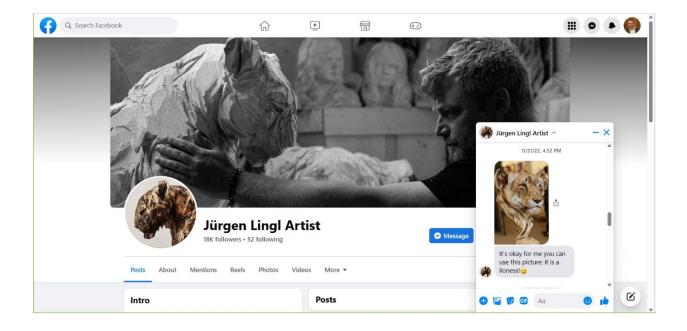


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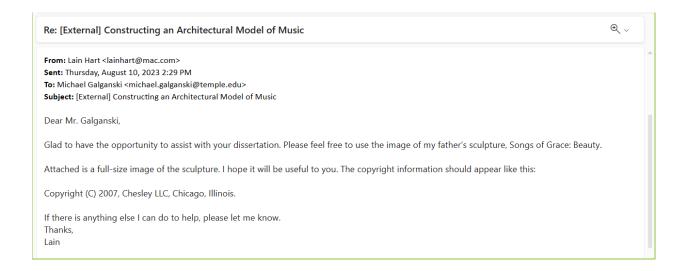


Figure 2.91 image reproduced from Sean Avery's "Hummingbird." © Sean E Avery.

On Tue, Nov 22, 2022 at 4:02 PM <sean@seaneavery.com> wrote:

Hi Michael,

Thanks for reaching out! I'm glad you like my work and would be honoured for you to use it in your dissertation. Here is a selection of high-resolution images that might be good to use:

https://u.pcloud.link/publink/show?code=kZwWKWkZpSer4Osxa2pH8PVui4LcNyG1E9I7

All the best, Sean

Sean E Avery

Childrens' Author-Illustrator, Teacher & Designer
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Figure 2.92 image reproduced from "Seashore Library."

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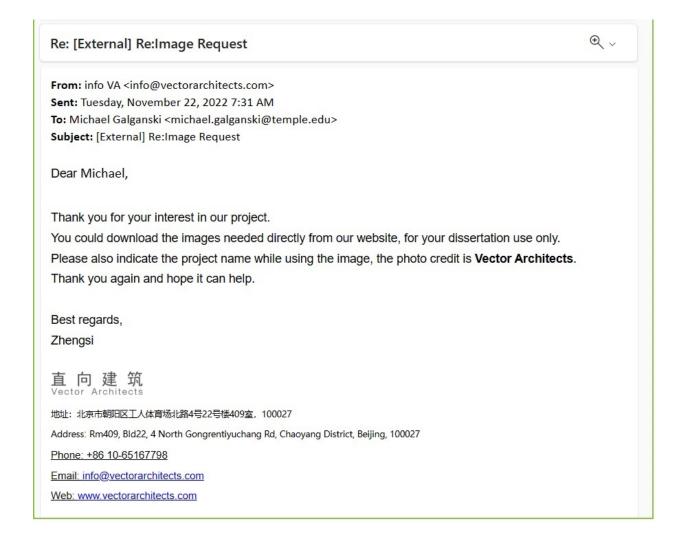


Figure 2.93 image photographed by Garret Root and reproduced from "Boulevard Park."

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Sent: Monday, August 7, 2023 9:19 PM

To: Michael Galganski < michael.galganski@temple.edu>

Subject: [External] Re: Image Request

You have our permission to use the image; please credit Preservation Sacramento and photographer Garret Root.

William Burg

Preservation Sacramento

Figure 2.95 image reproduced from Ben Faber's "Real-time 3D Spectrogram now available in SignalScope for iOS."

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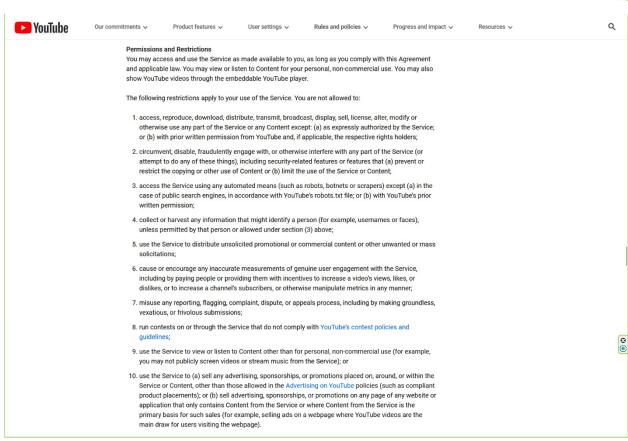


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Re: Image Request



Michael Galganski < galganski.music.array@gmail.com>

11/20/2022 10:06 PM

On Sun, Nov 20, 2022 at 12:42 PM <u>abstract412@gmail.com</u> <<u>abstract412@gmail.com</u>> wrote: Hi Michael,

Thank you for contacting me. I am happy to hear you like my design.

I am forwarding you the JPG file in the attachment below.

If you need any other image format, feel free to contact me again.

Best of luck with your dissertation, Abstract

Figure 2.97 image reproduced from Anton Smit's "Masks: Oblivion of the Waves." © *Anton Smit*.

On Sun, Nov 20, 2022 at 11:22 AM Roelien Smit < Roelien@antonsmitsculptures.co.za > wrote:

Dear Michael,

Thank you for your mail and interesting connotation to my sculpture

You have my permission and are welcome to use the image for your dissertation. It will be very interesting to see how you use it

Best of luck and warm regards,

Anton Smit

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From: Michael Galganski < galganski.music.array@gmail.com >

Sent: Sunday, November 20, 2022 4:09:29 PM **To:** info@antonsmit.co.za < info@antonsmit.co.za >

Subject: Image Request

Figure 2.98 image photographed by Mike Finkelstein and produced from "78 Morton Street." © *Duplex Imaging*, LLC and Leslie J. Garfield & Co., Inc.

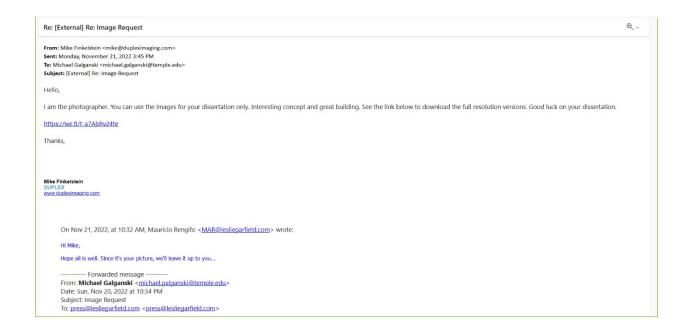


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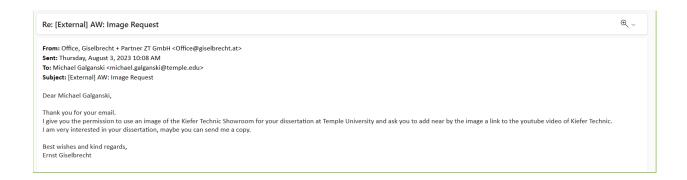


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Figure 2.103 image photographed by David Dixon and reproduced from "Star Chamber, Bolsover Castle."

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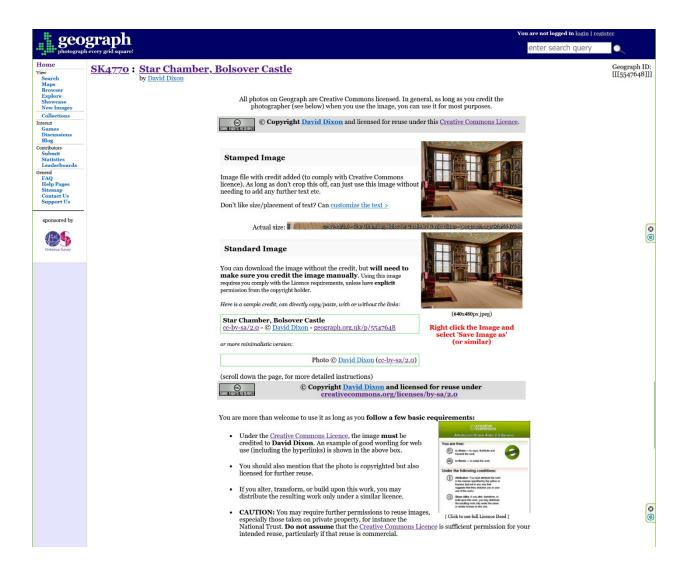


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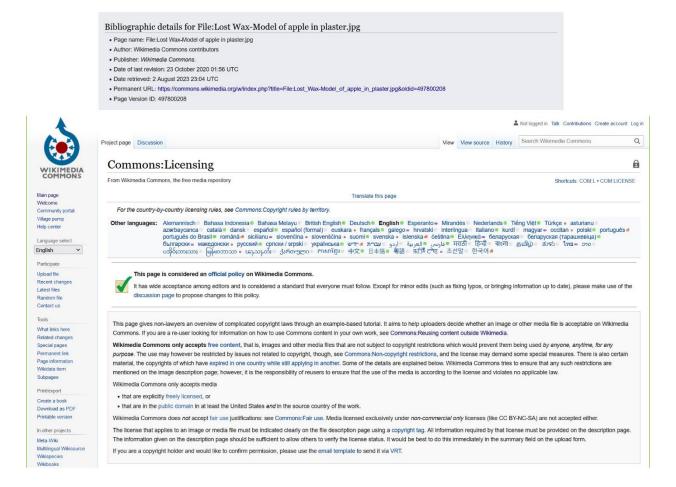


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1/ 2

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INVOICE/AUTHORIZATION

Michael Galganski To:

280 West Walnut Lane, 3 Philadelphia, PA 19144 Michael Galganski

dyllicarray@gmail.com

Phone: 484-358-1968 P.O.:

Invoice:

12/30/2022

AR2INV10993

13-3405268 Federal ID:

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Henry Moore, "Upright Form" 1966

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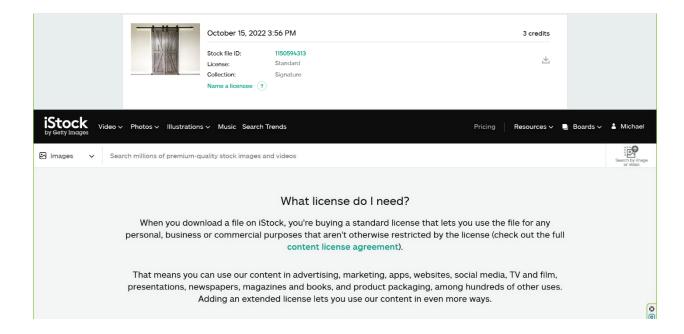


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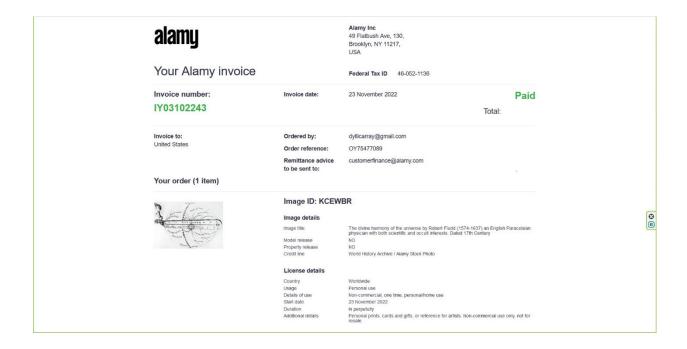


Figure 2.119 image reproduced from Sachsische Landesbibliothek – Staats – und Universitatsbibliothek Dresden archives.

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Re: [External] SLUB Dresden - Deutsche Fotothek (Ticket-2023052780000097 - Robert Fludd - Encycl.med.46,misc.2,3)

⊕ 、

From: Erlenkamp, Bettina <Bettina.Erlenkamp@slub-dresden.de>

Sent: Friday, June 2, 2023 2:27 PM

To: Michael Galganski <michael.galganski@temple.edu>

Subject: [External] SLUB Dresden - Deutsche Fotothek (Ticket-2023052780000097 - Robert Fludd - Encycl.med.46,misc.2,3)

Dear Mr. Galganski,

We thank you for your inquiry and authorize the publication of the following image free of charge:

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Our address: SLUB Dresden, Deutsche Fotothek, 01054 Dresden (no street)

Many thanks in advance.

Kind regards,

Bettina Erlenkamp

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Re: Image Request



Dale Dougherty <dale@make.co>

11/23/2022 11:26 AM

To: Michael Galganski Cc: editor@make.co; pr@make.co

Michael

You have our permission to use the image but you should also make sure that the creator (Jim Hannon) approves as well. It is his image that we published.

Thanks,

Dale

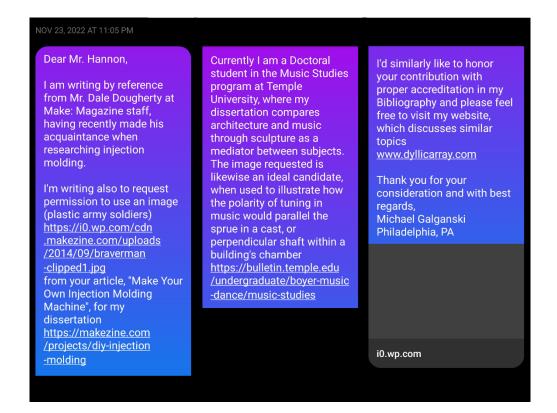
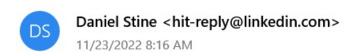


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To: Michael Galganski

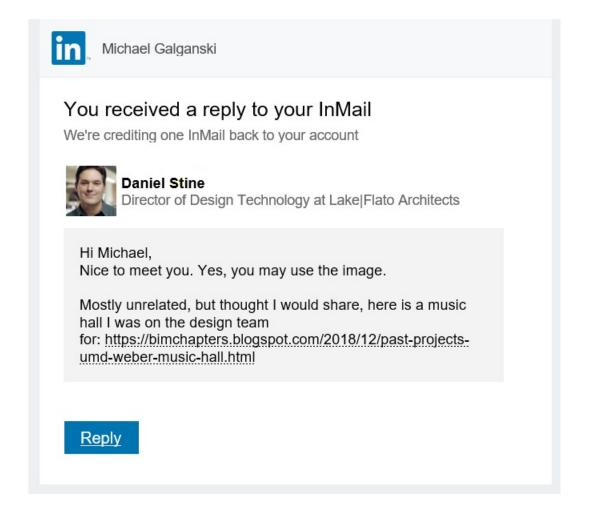


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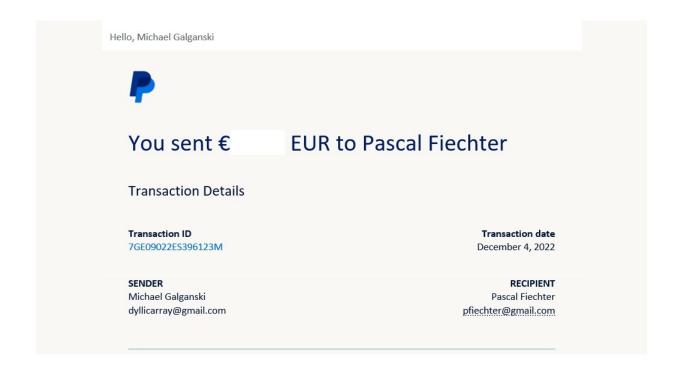


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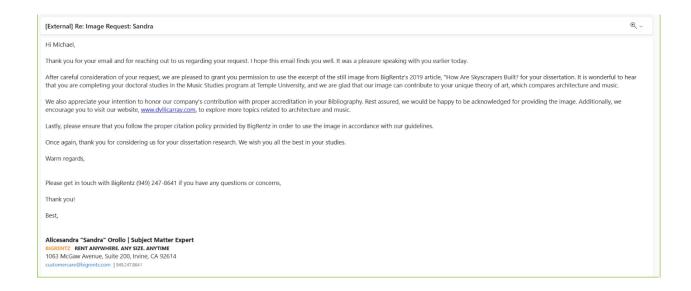


Figure 2.130 image reproduced from Andrew Chase's "Giraffe."

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Re: Image Request



Andrew Chase <photographer@andrewchase.com>

12:07 PM

To: Michael Galganski

Dear Mr. Galganski,

Thank you for your interest in my work, it's very flattering. You are welcome to use images of the giraffe in your dissertation. Good luck!

Regards

Andrew

Figure 2.131 image photographed by Kevin Curley and reproduced in "Can Minnesota Afford the Upkeep of Roads and Bridges?"

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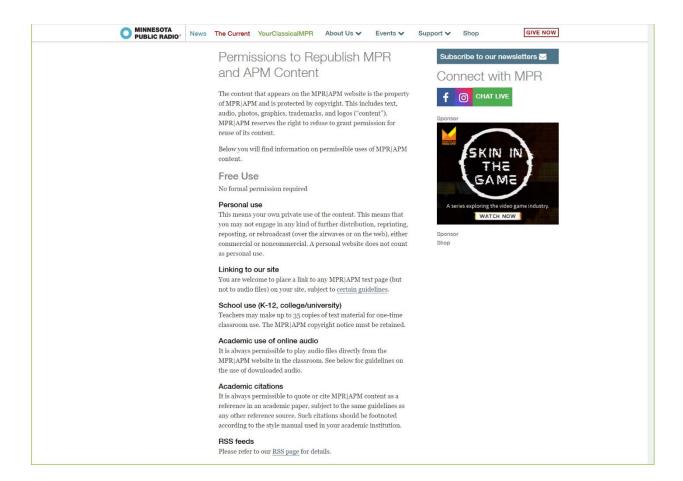


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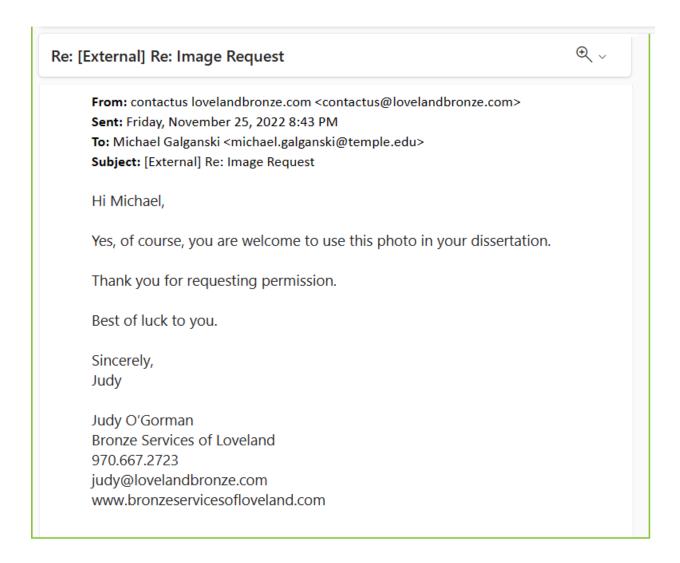


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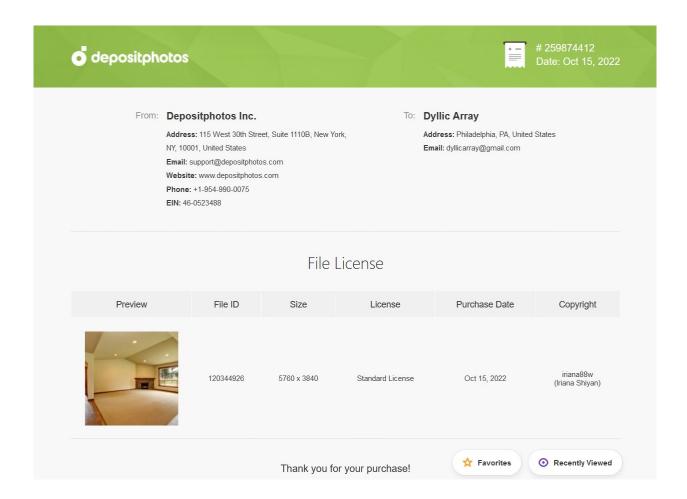
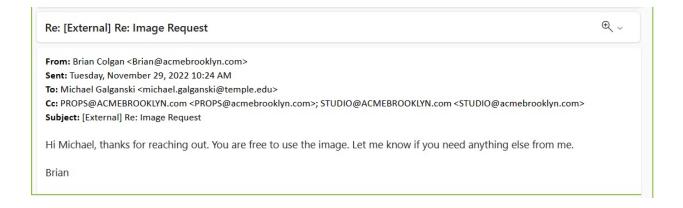


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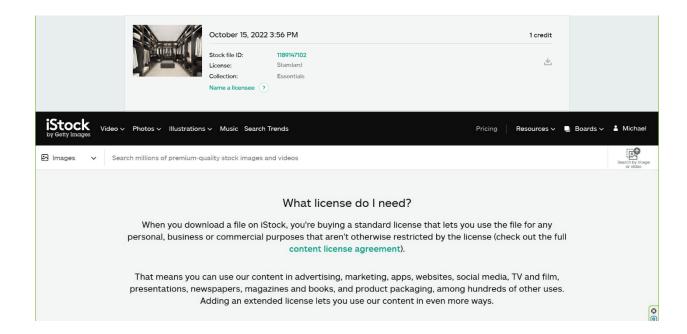


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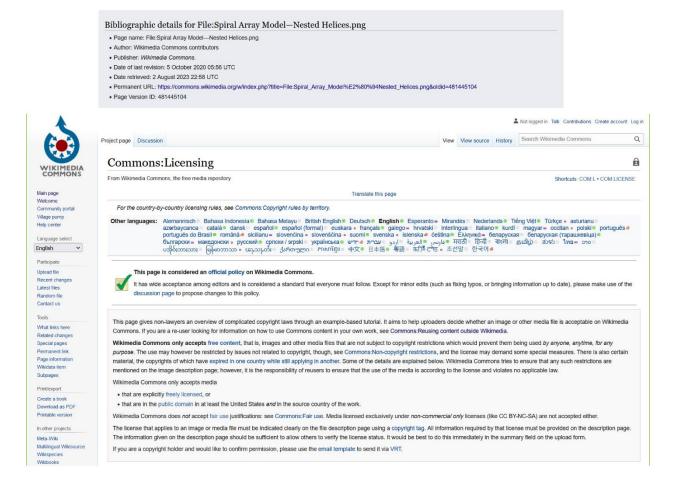


Figure 2.144 image reproduced from Ferri Farahmandi's "Hitesh Durgani por Ferri Farahmandi."

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On Fri, Nov 25, 2022 at 6:15 PM Ferri Farahmandi <6e530aa3-24e6-4941-87c0-9542a4bb6a41@crm.wix.com> wrote:

You've got a new message

Dear Michael, Thanks for your message and your kind words. You have my permission to use the image of my work. Kind regards Ferri Farahmandi

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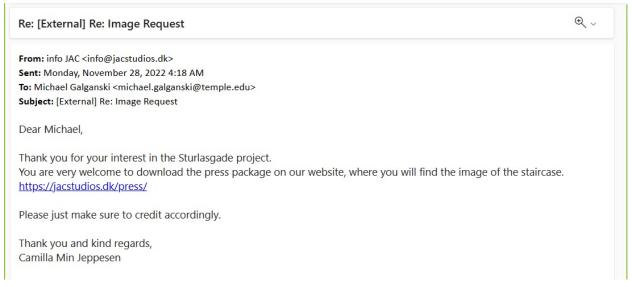


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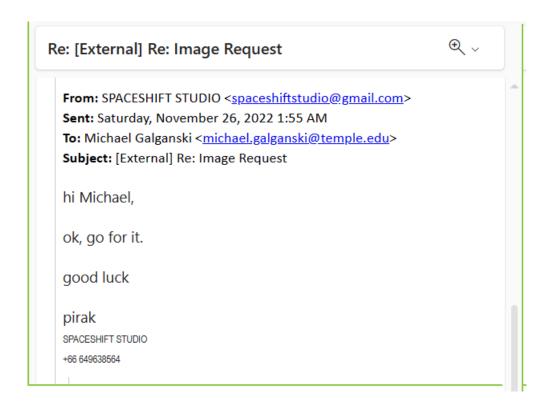


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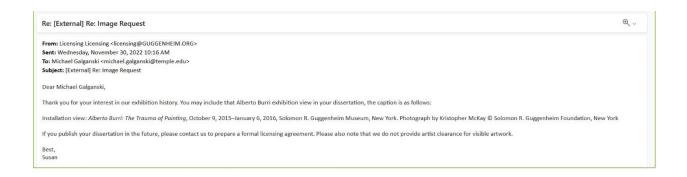


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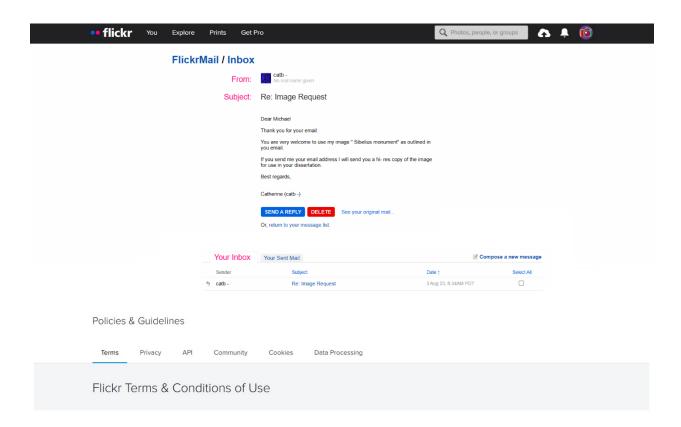


Figure 2.154 image photographed by Rhiannon Slatter and reproduced from "Saint Kilda Side Yard House," image 6/9.

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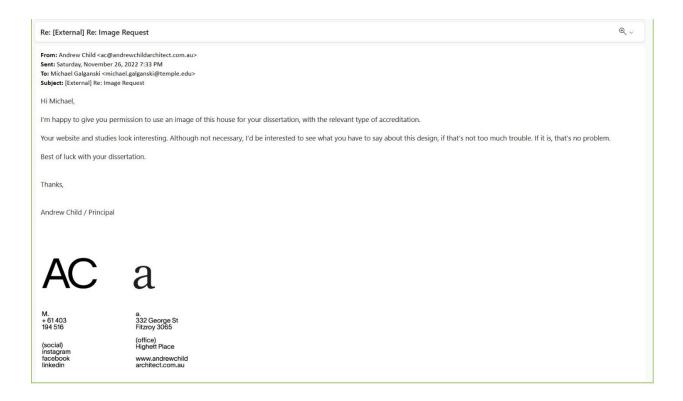
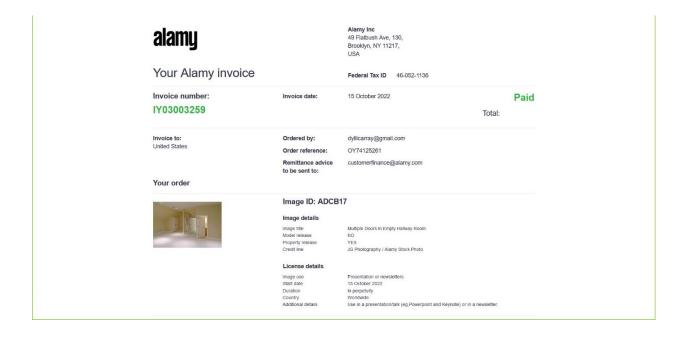


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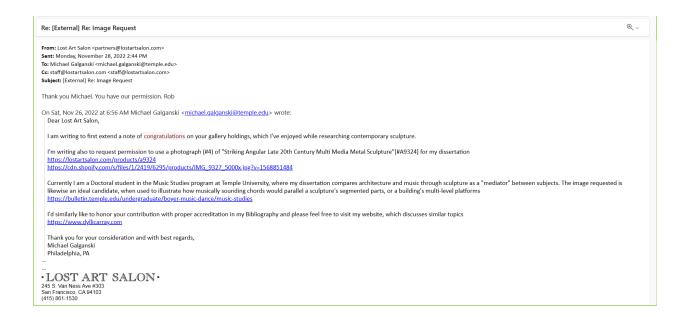


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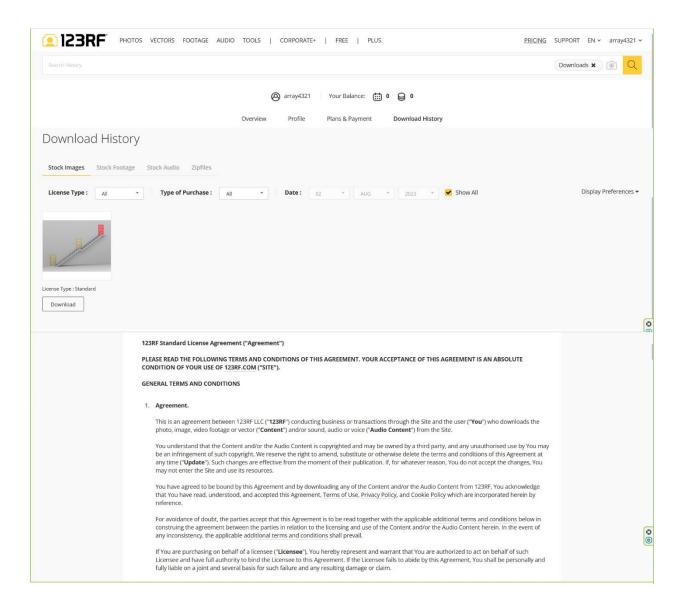


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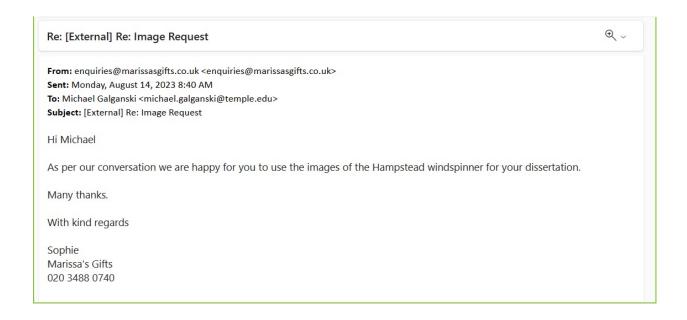


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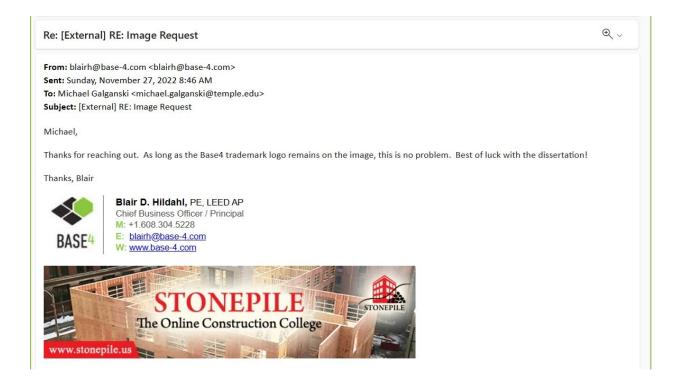


Figure 2.168 image reproduced from Rich Byrd's *Music Theory Study Guide for Prospective Music Students*, "Circle of Fifths."

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Re: [EXTERNAL] Image Request

From: Byrd, Rich <Rich.Byrd@eku.edu>

Sent: Thursday, December 15, 2022 1:14 PM

To: Michael Galganski <michael.galganski@temple.edu>

Subject: Re: [EXTERNAL] Image Request

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Sent from my iPhone

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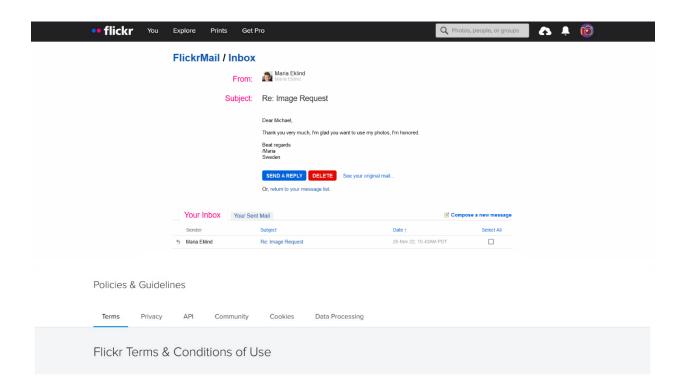


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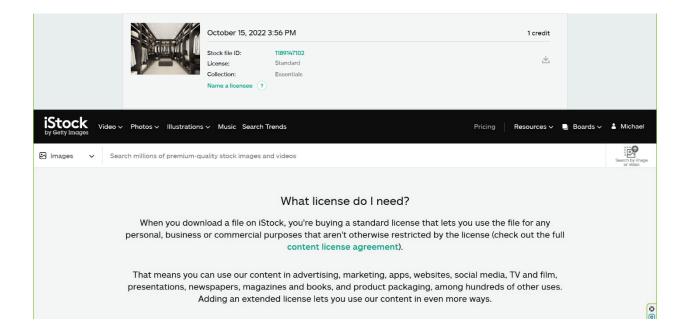


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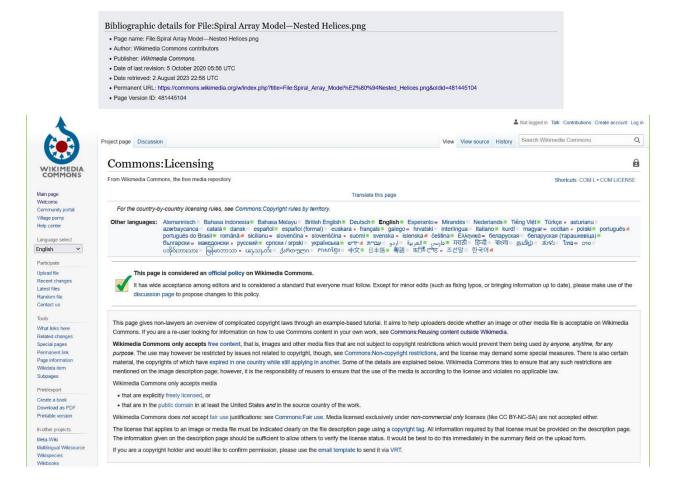


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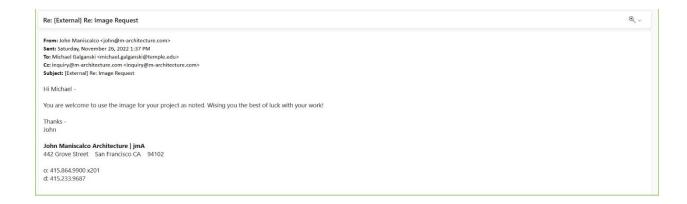


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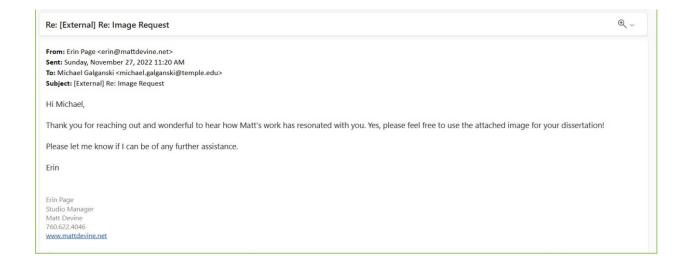


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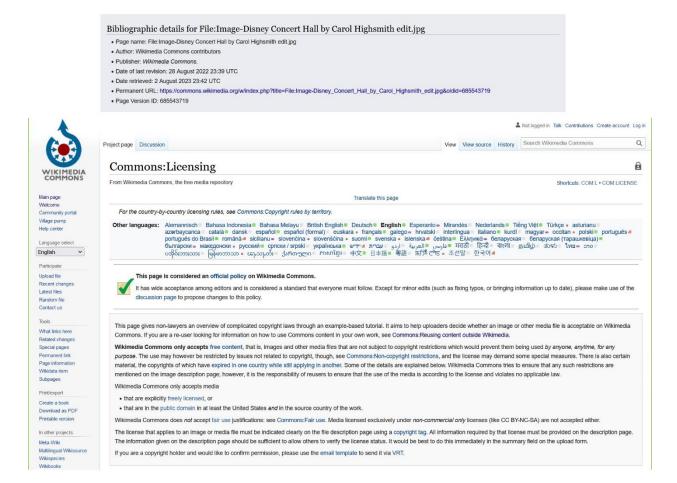


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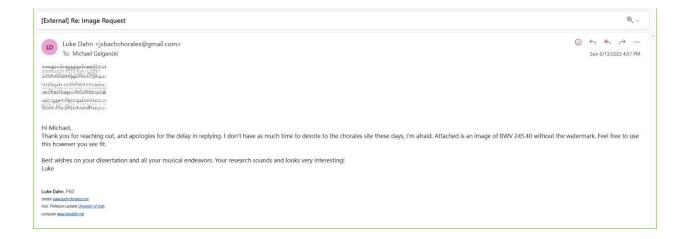


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On Mon, Nov 28, 2022, 3:39 AM Info < lnfo@lorenzoquinn.com > wrote:
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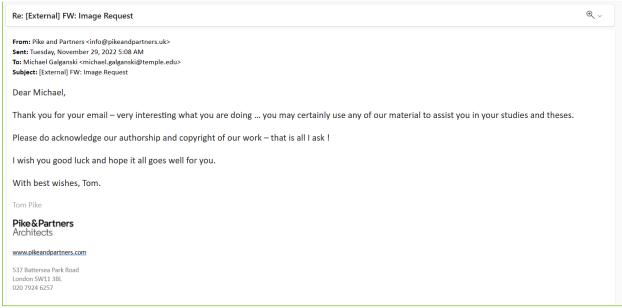
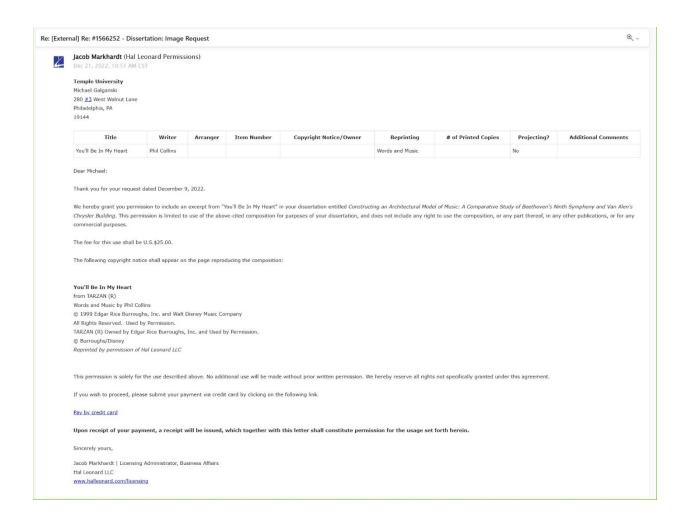


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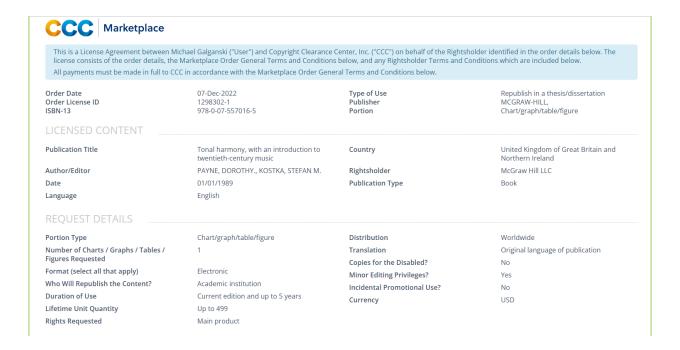


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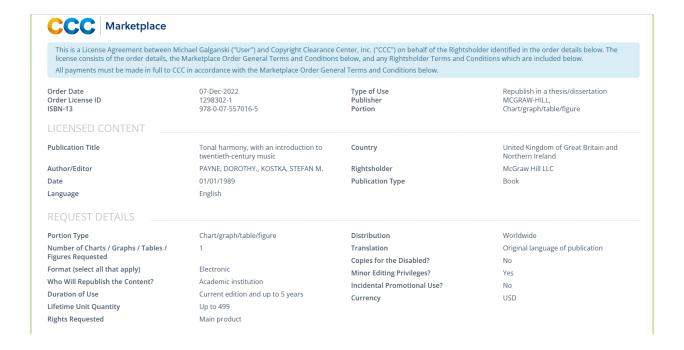


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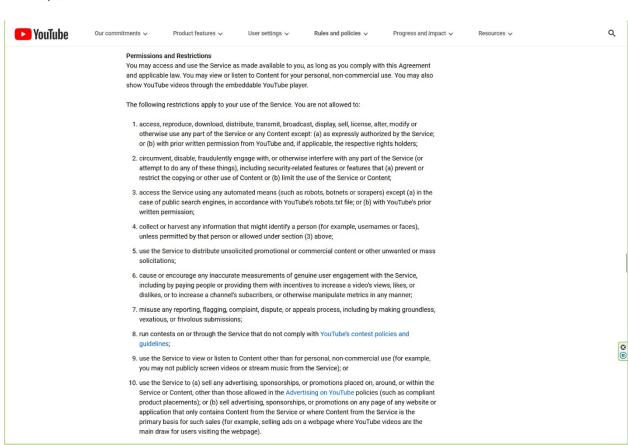


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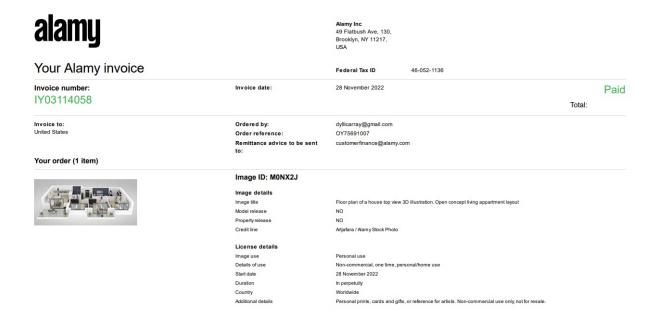


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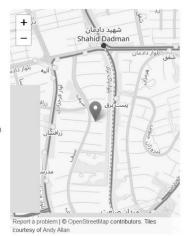
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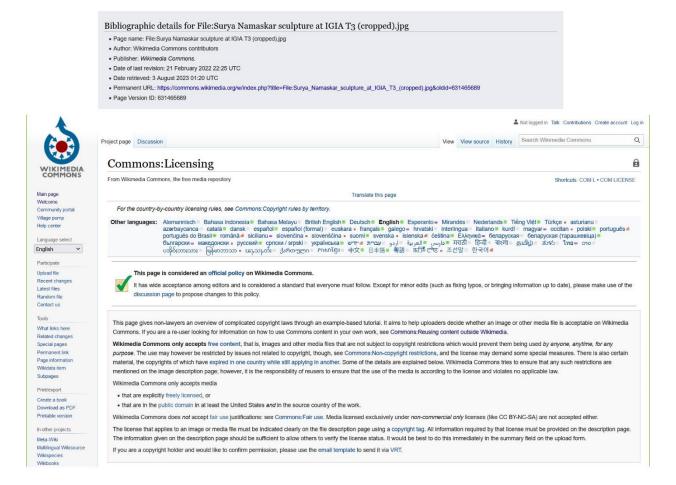


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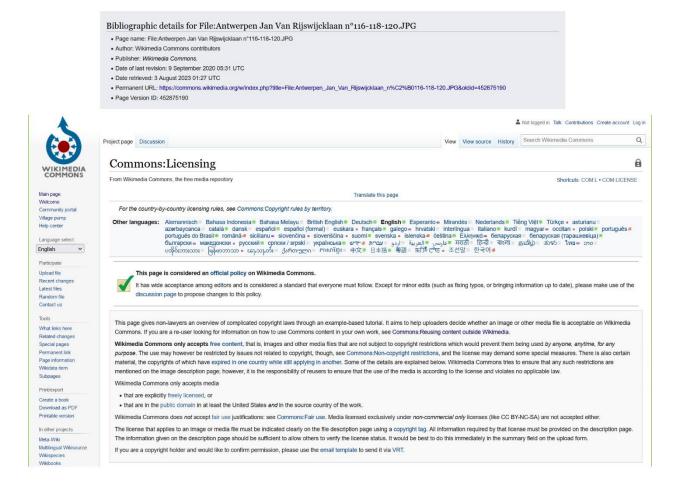


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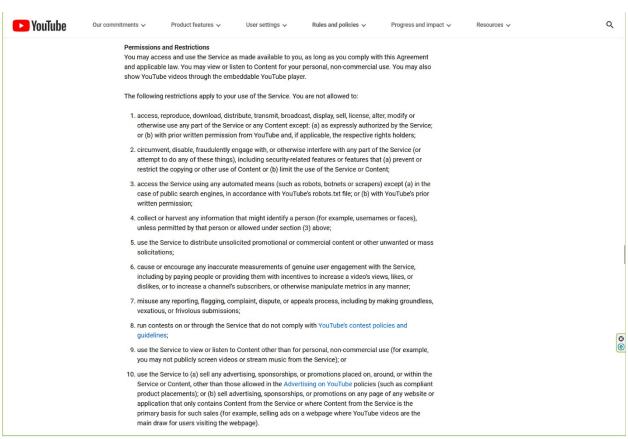


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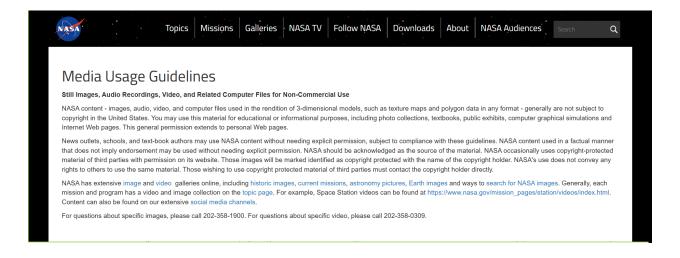


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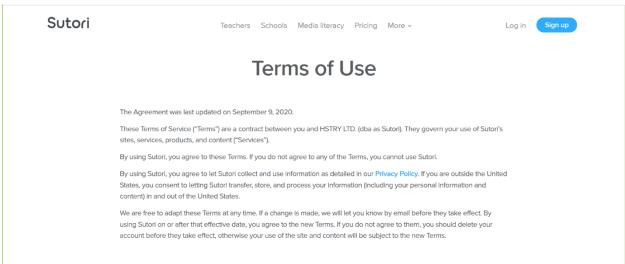
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I assume you need a high definition photo, if you confirm this we will send it to you via wetransfer.
Best
Carmen Sabbatini
Artist Assistant
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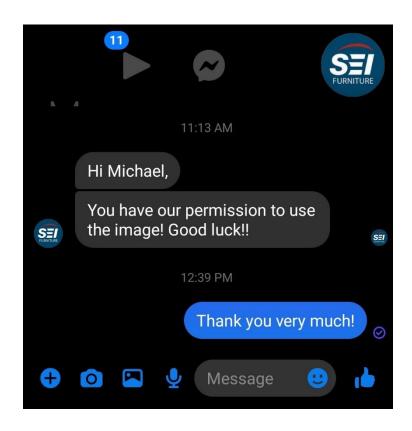
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On Sun, May 1, 2022, 4:55 AM Sławomir Golonko <<u>sarenkaart@gmail.com</u>> wrote:

Dear Mr. Galganski,

Thanks.

Of course you can use photos of Zui.

Very interesting combination of music, architecture and sculpture ... I think this is a new kind of use of metal mesh, more subtle ... In my opinion ... a metal mesh sculpture rubs against spirituality, it is very subtle and tangible at the same time ...

I use metal mesh in many ways ...

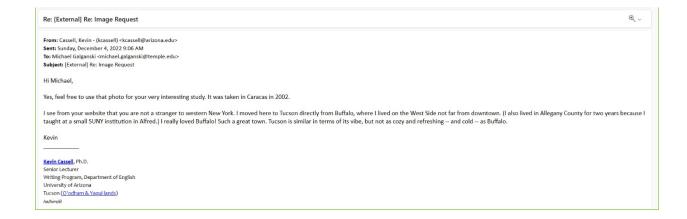
http://mofddesign.com/

I would love to hear and see the effect of your work :)

Best regards, Slawomir Golonko

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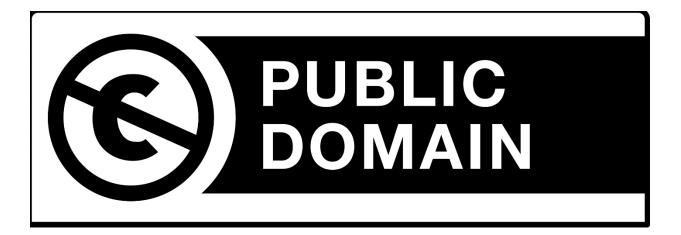
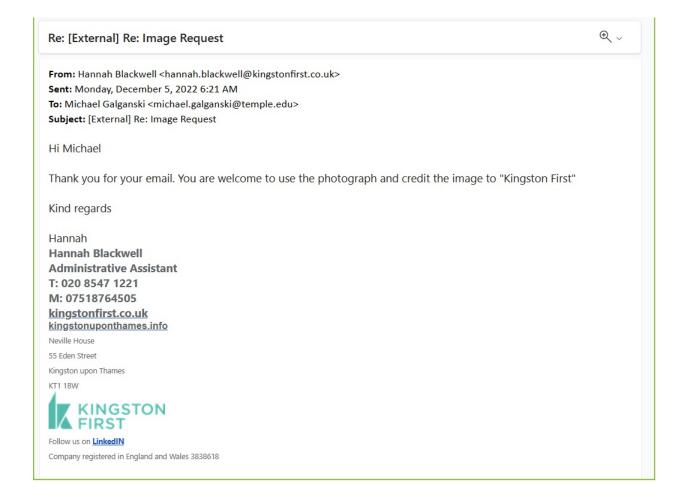


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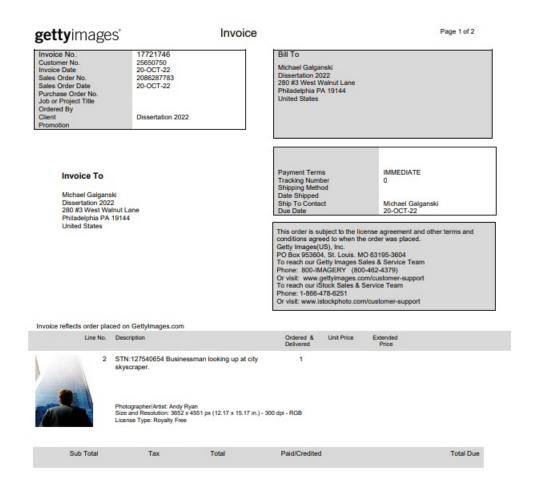


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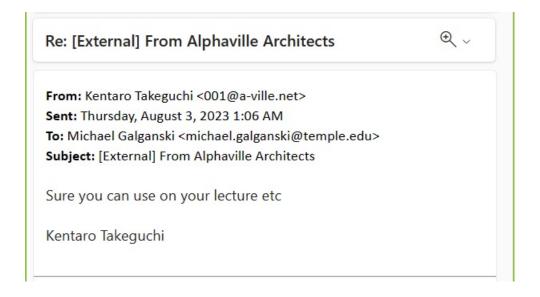
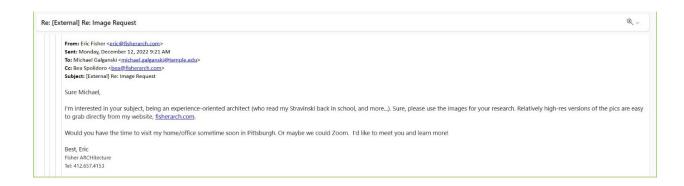


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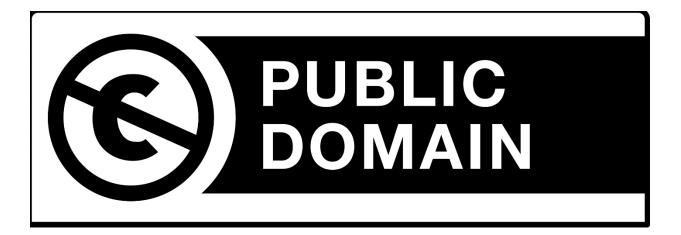
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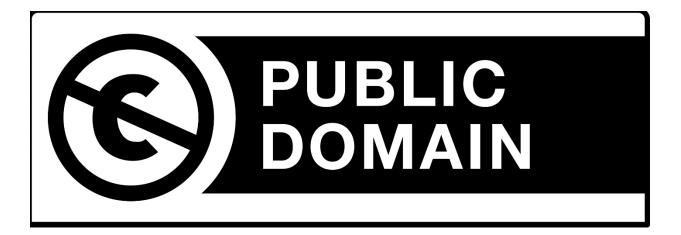
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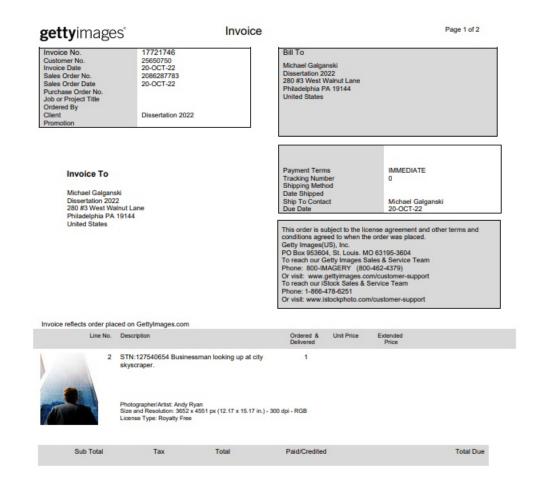


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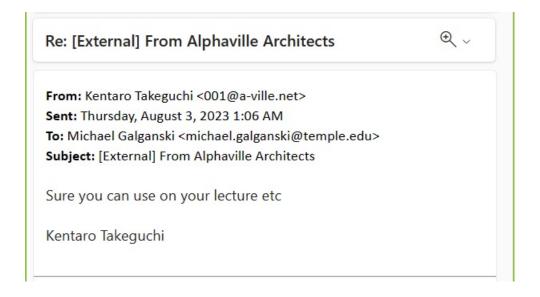
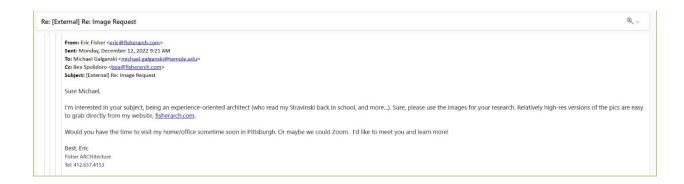


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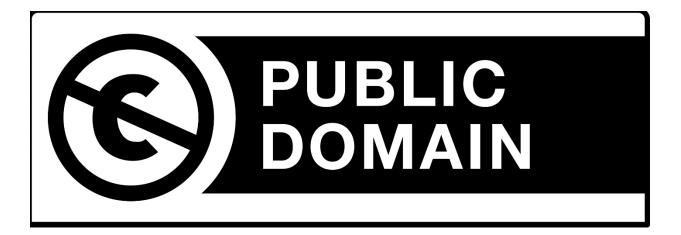


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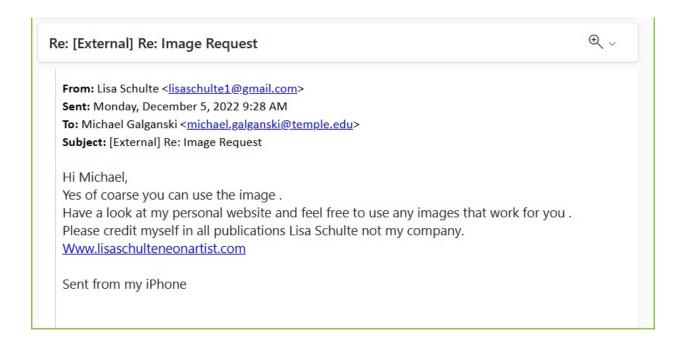


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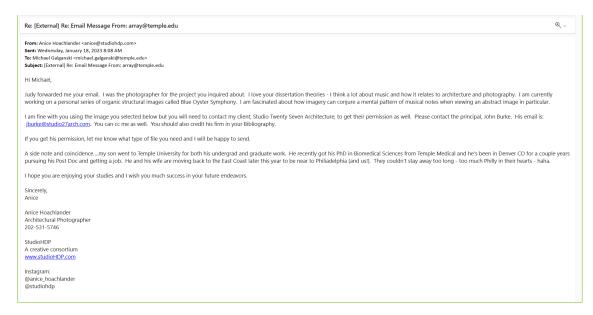




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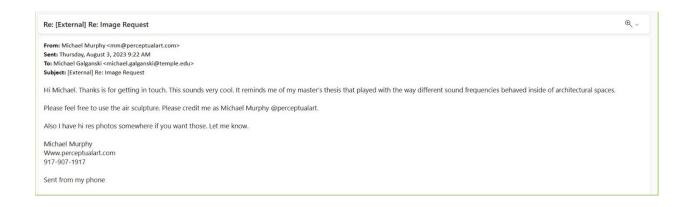
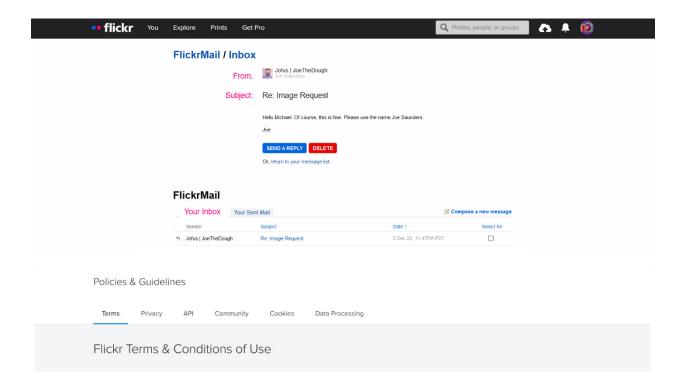


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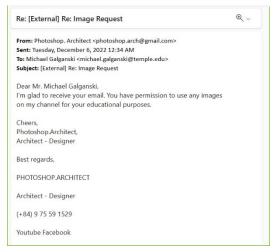
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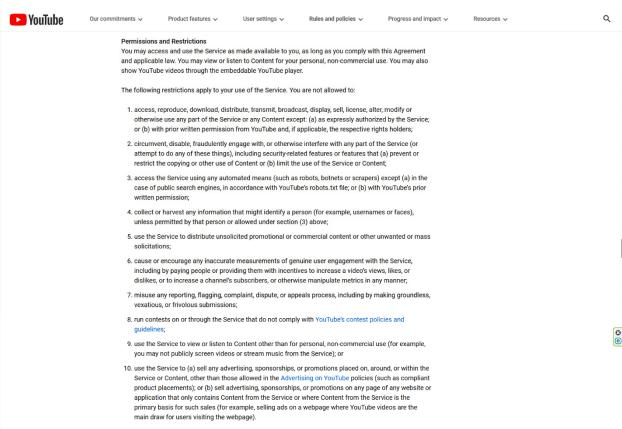


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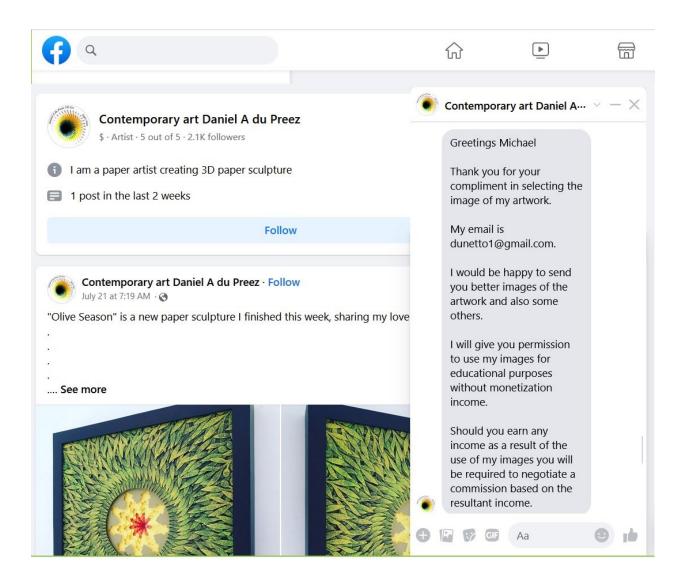
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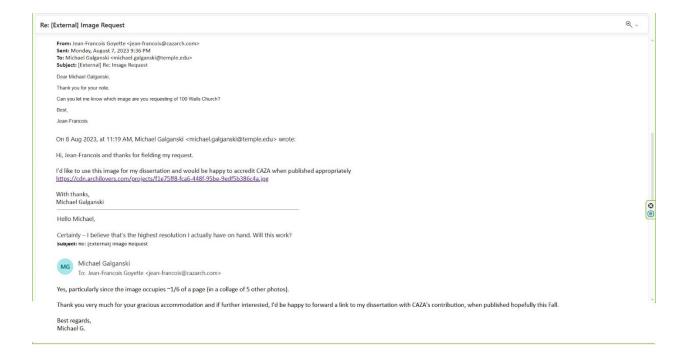
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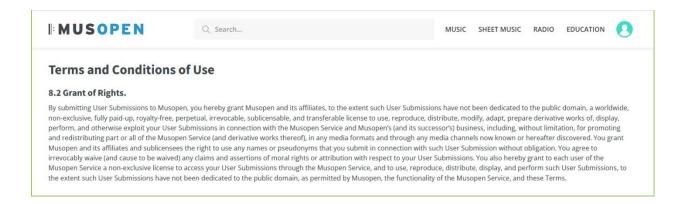
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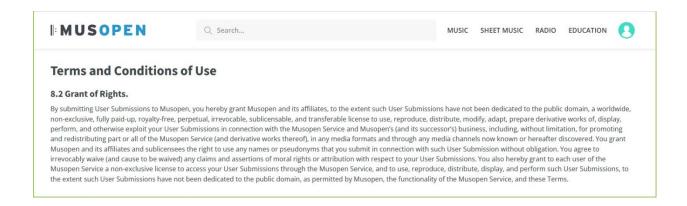
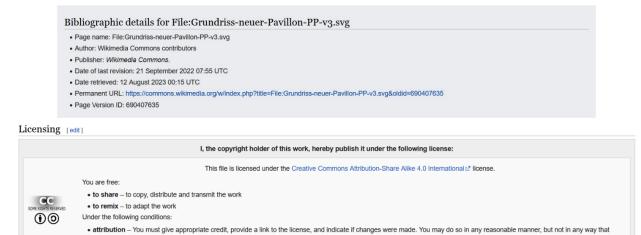


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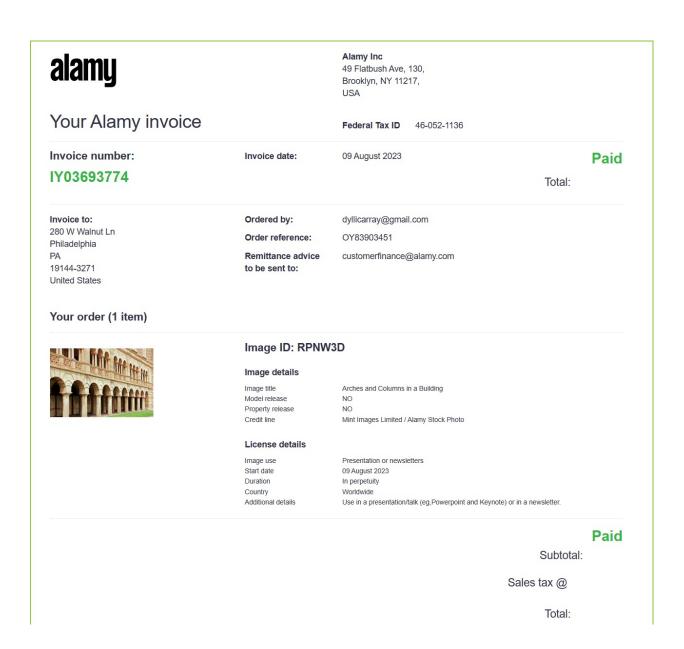


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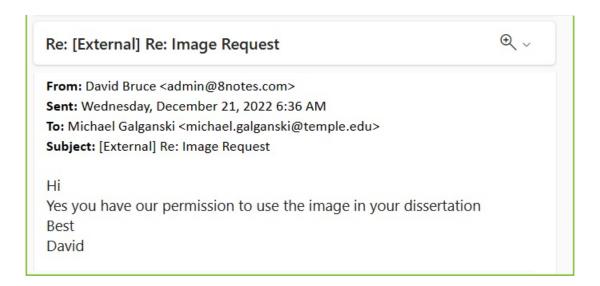


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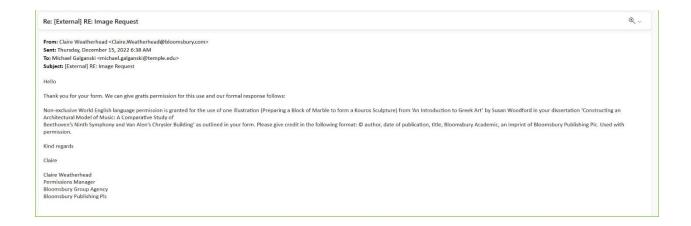


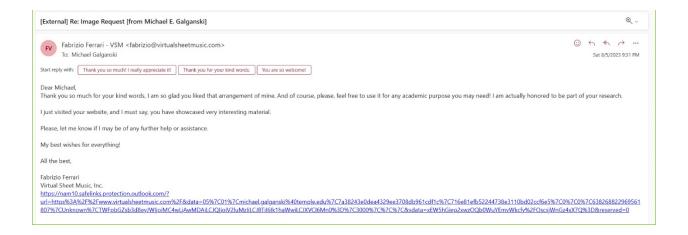
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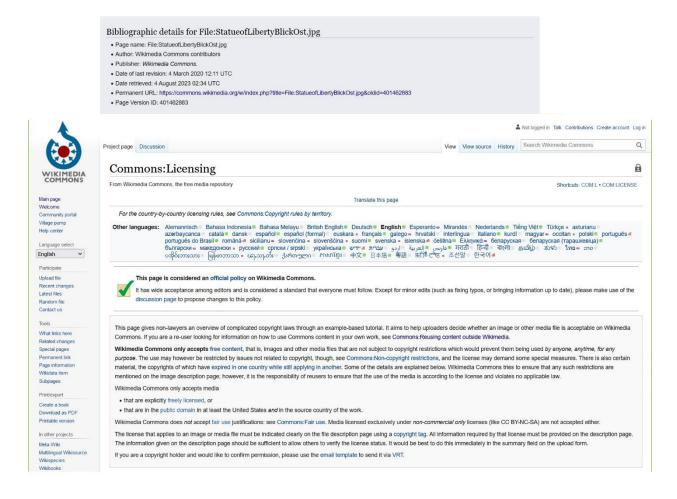


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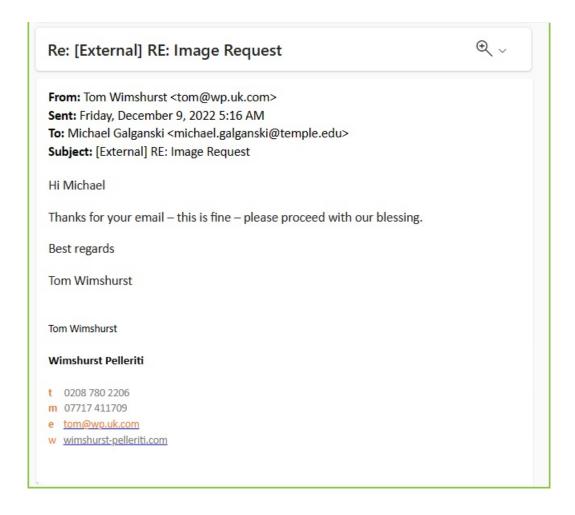


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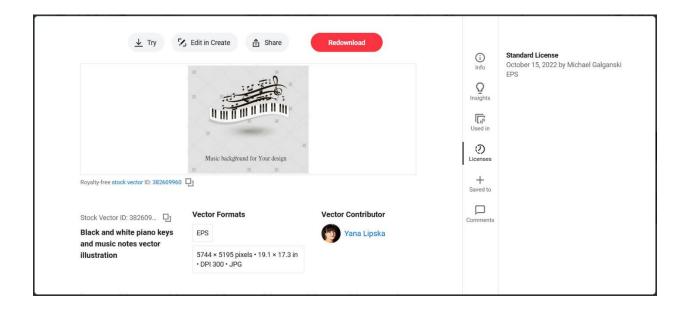


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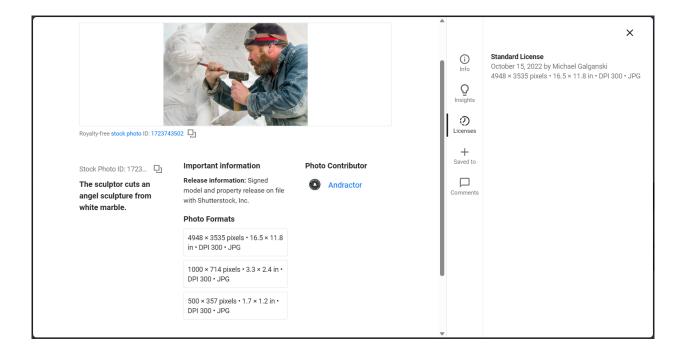


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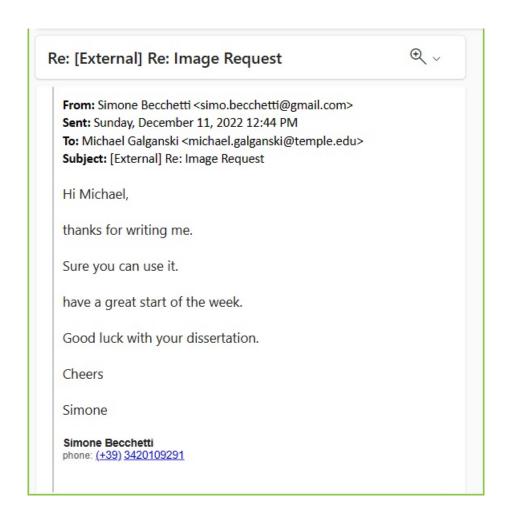


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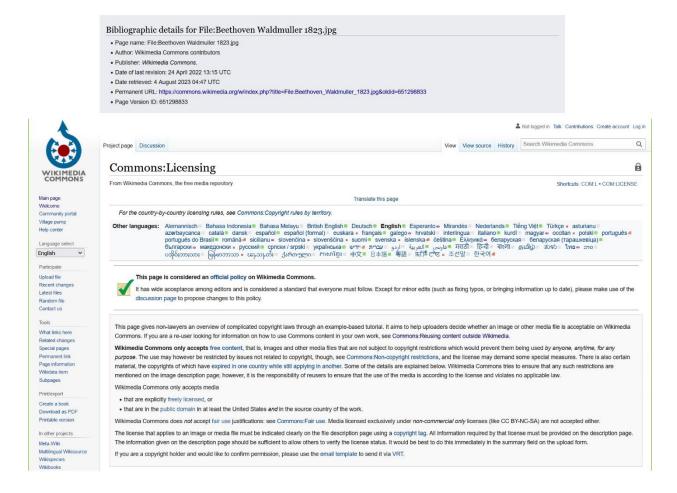


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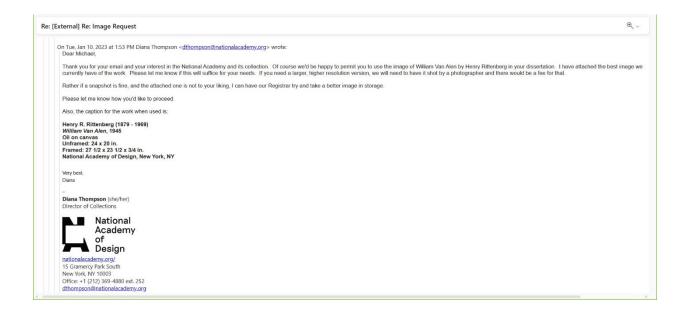


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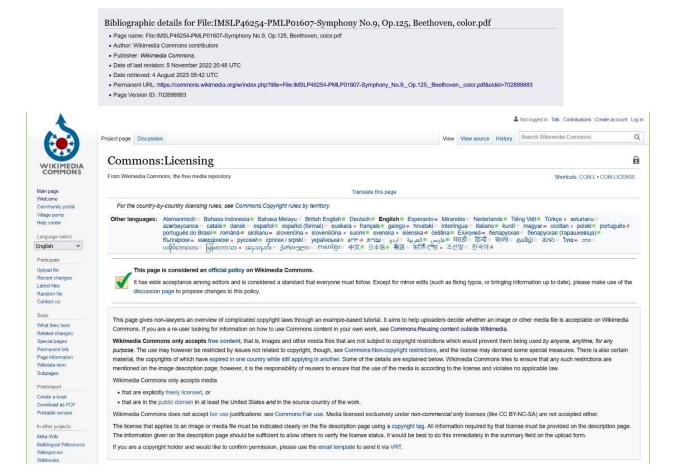


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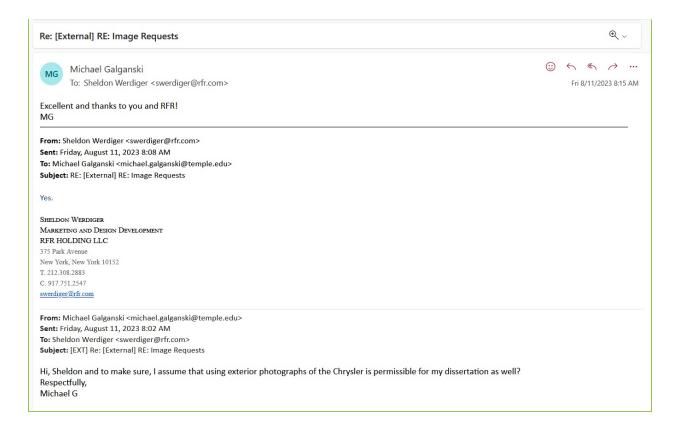


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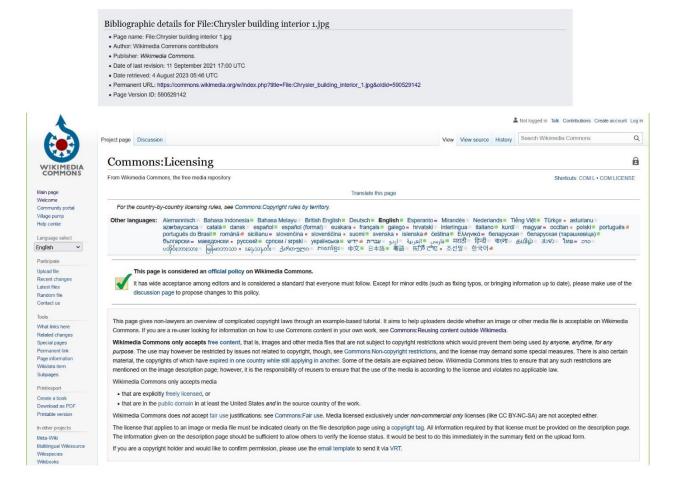


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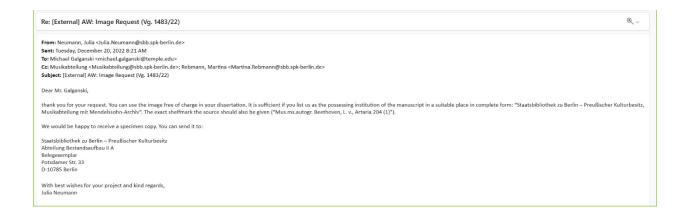
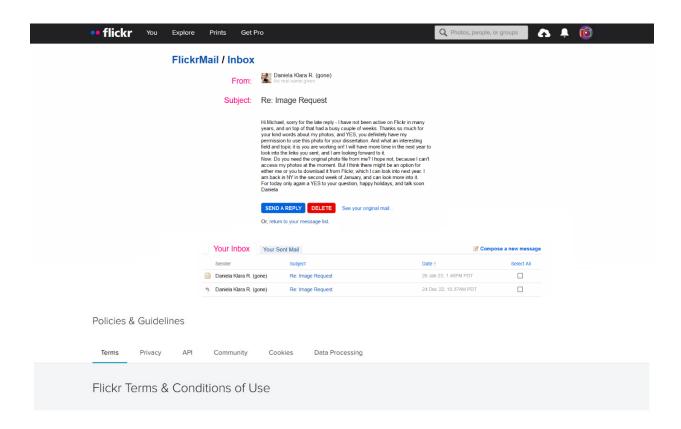


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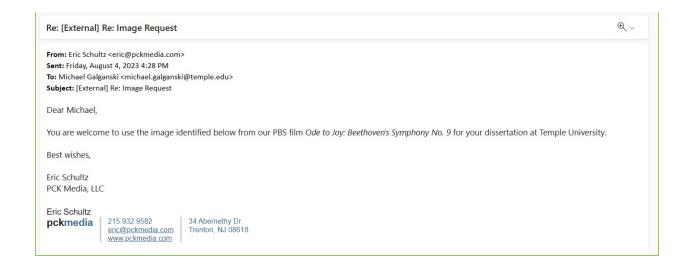


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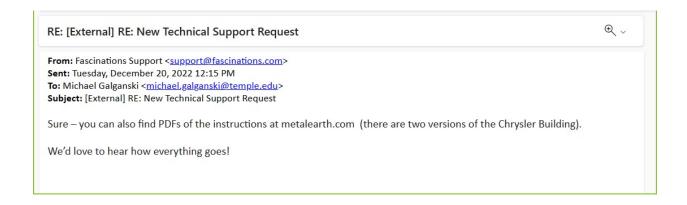


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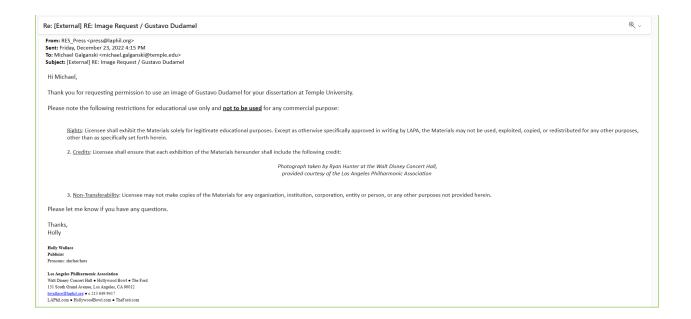
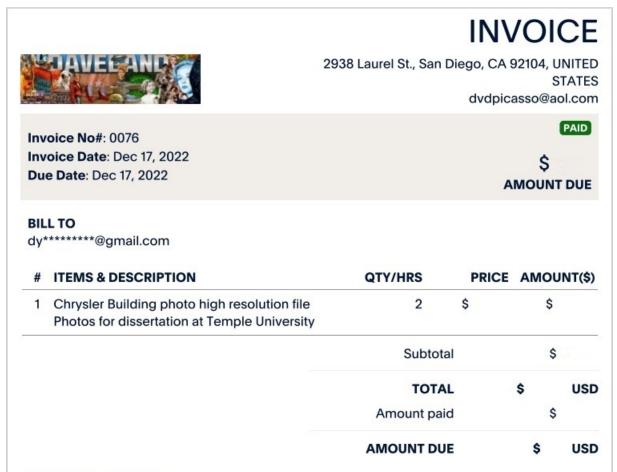


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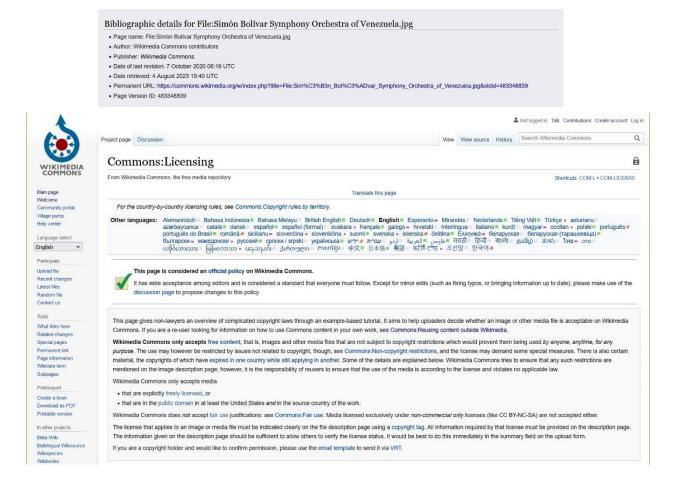


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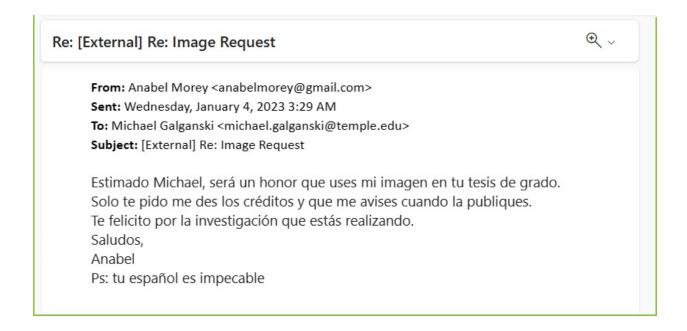


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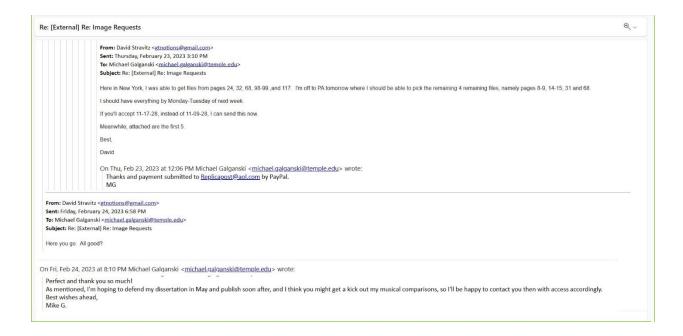
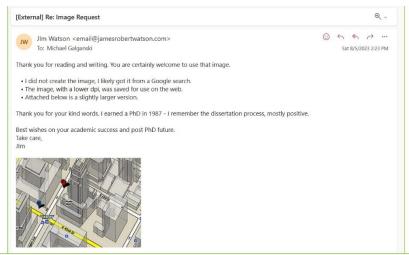


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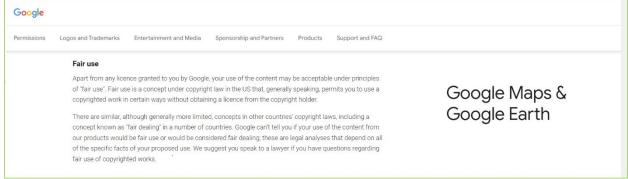


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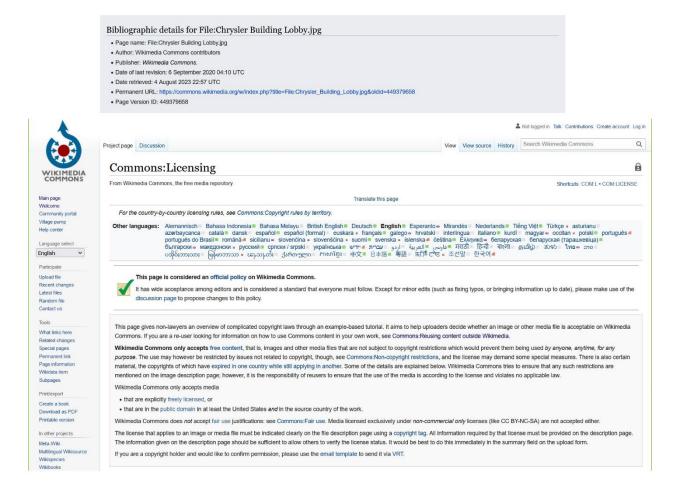


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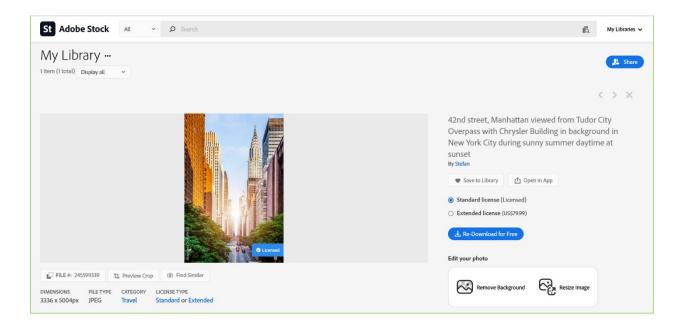


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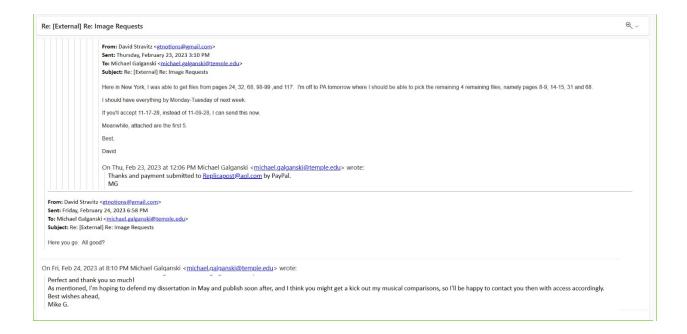


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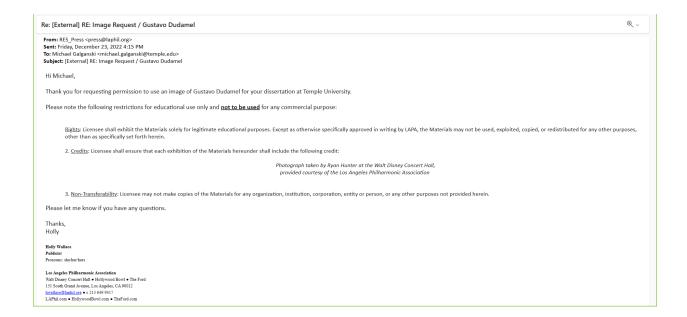


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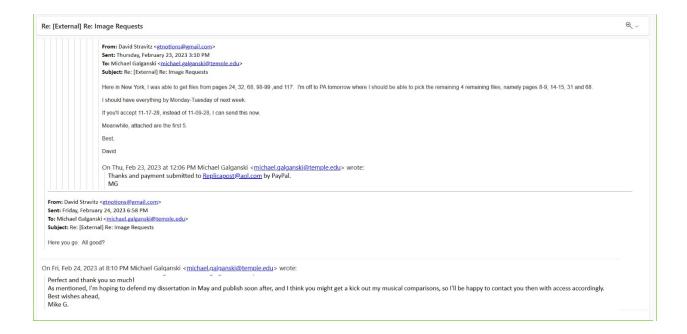


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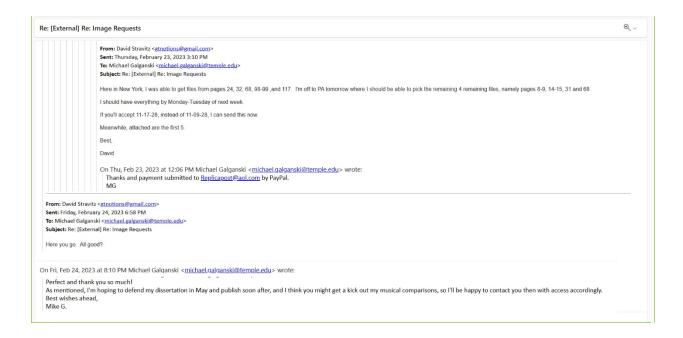
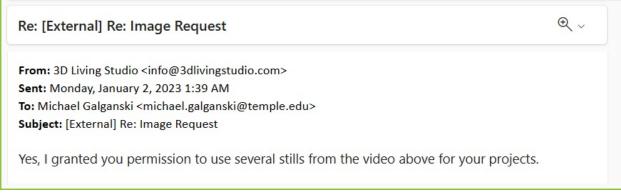


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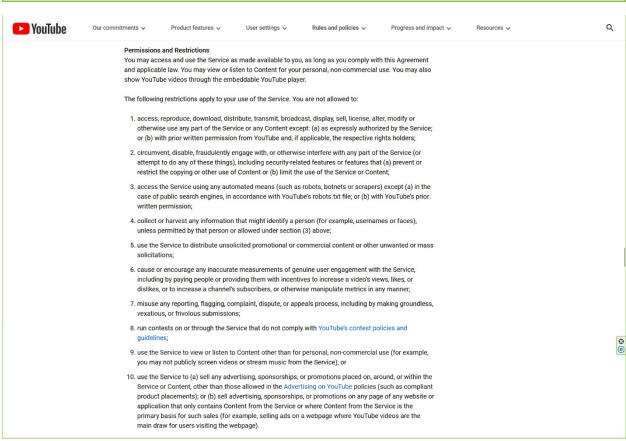


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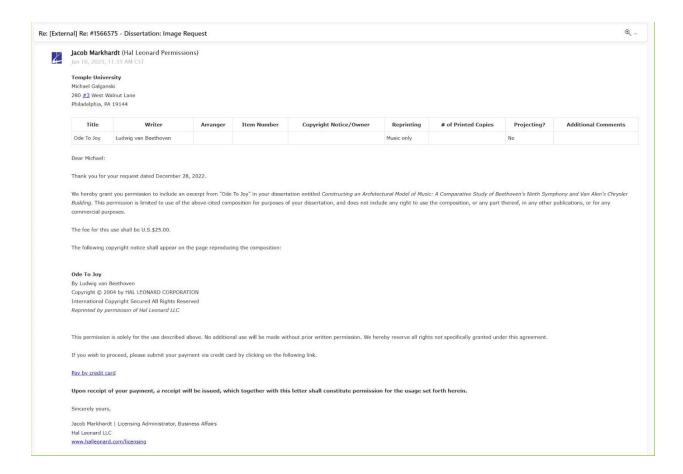


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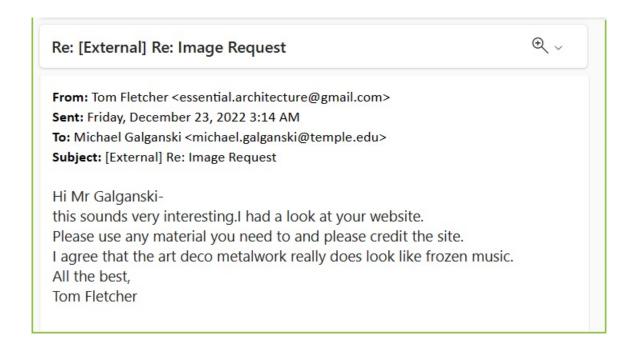


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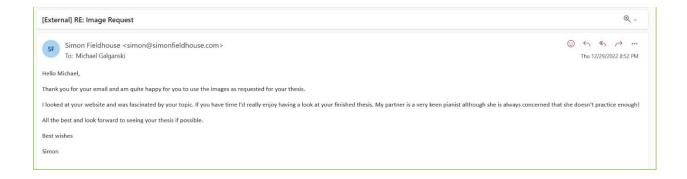


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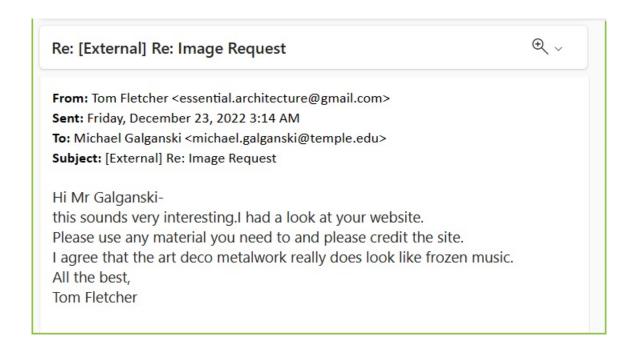
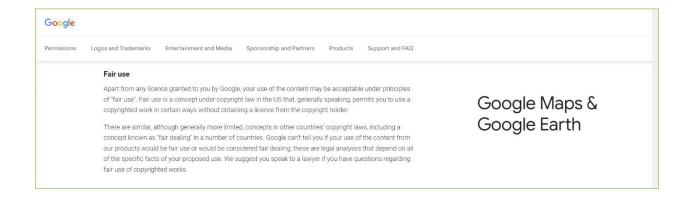


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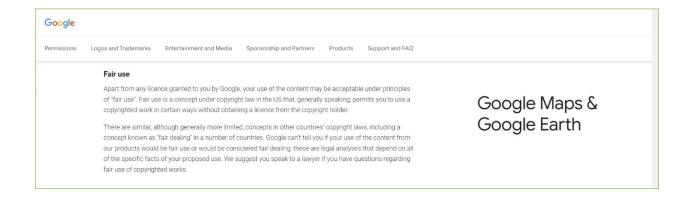


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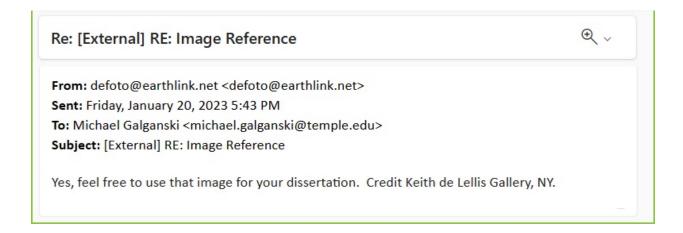


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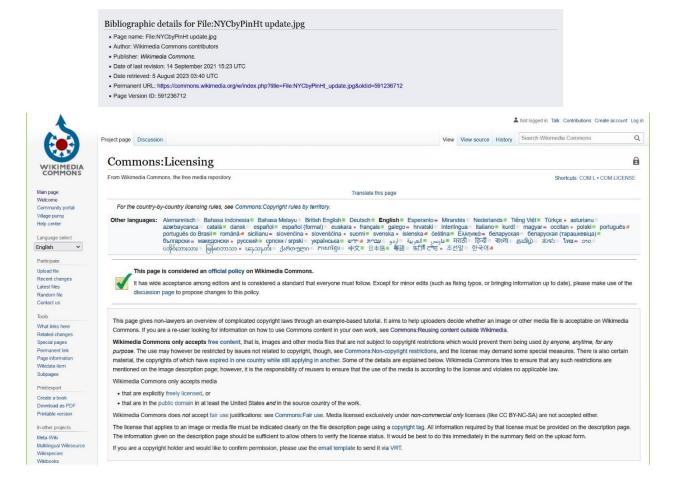


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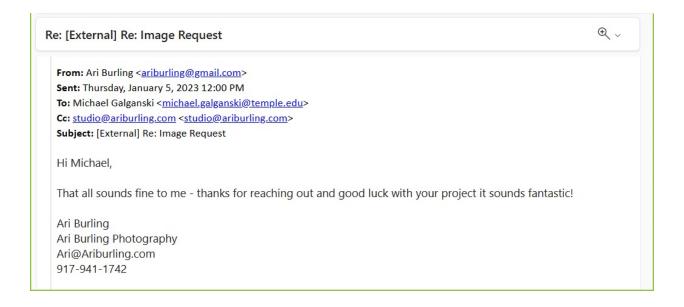


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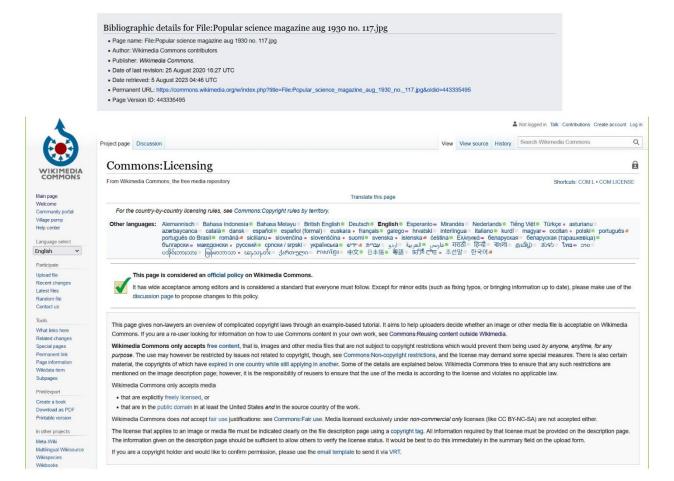


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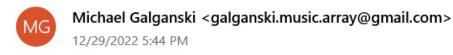
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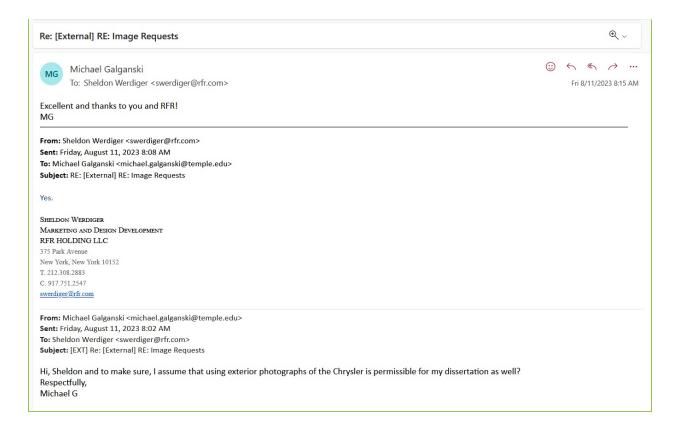
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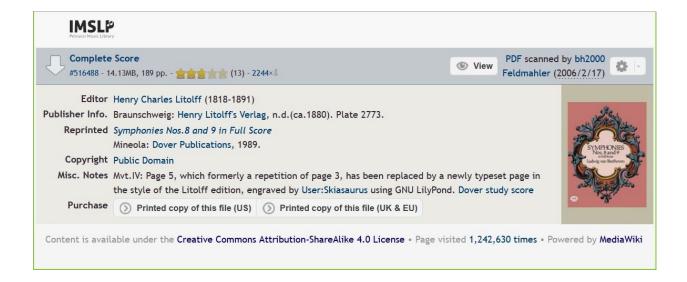
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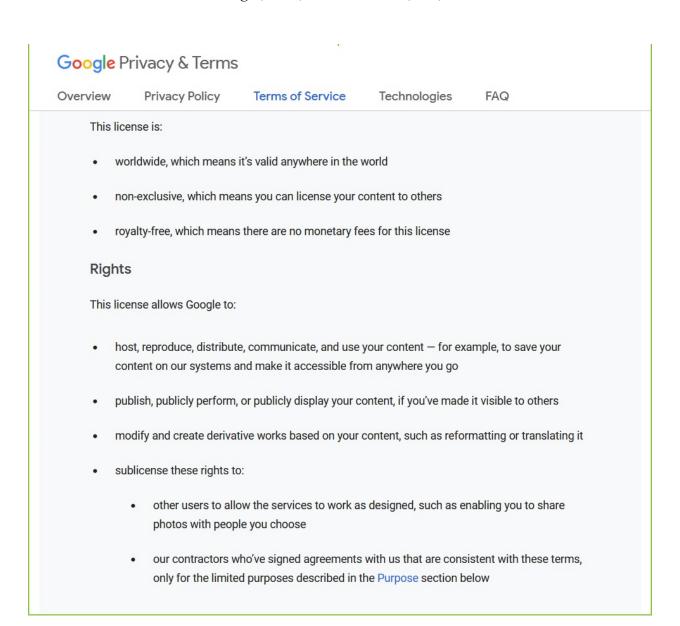
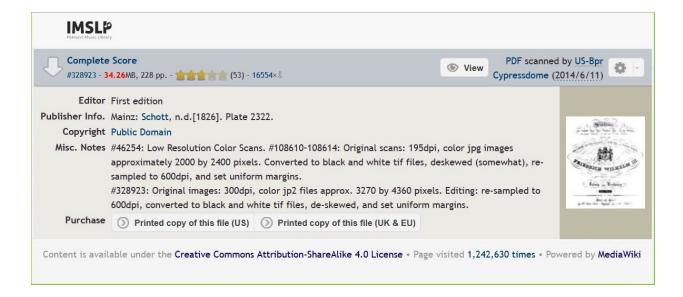


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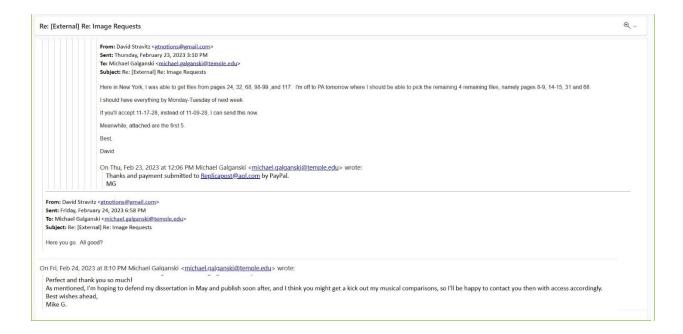


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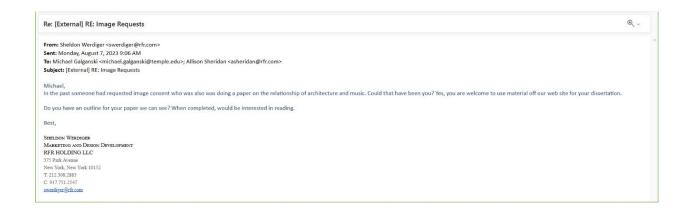
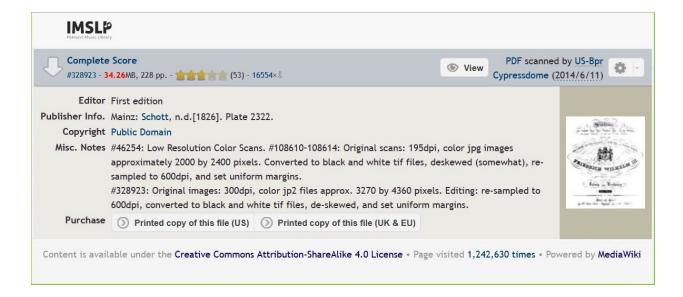


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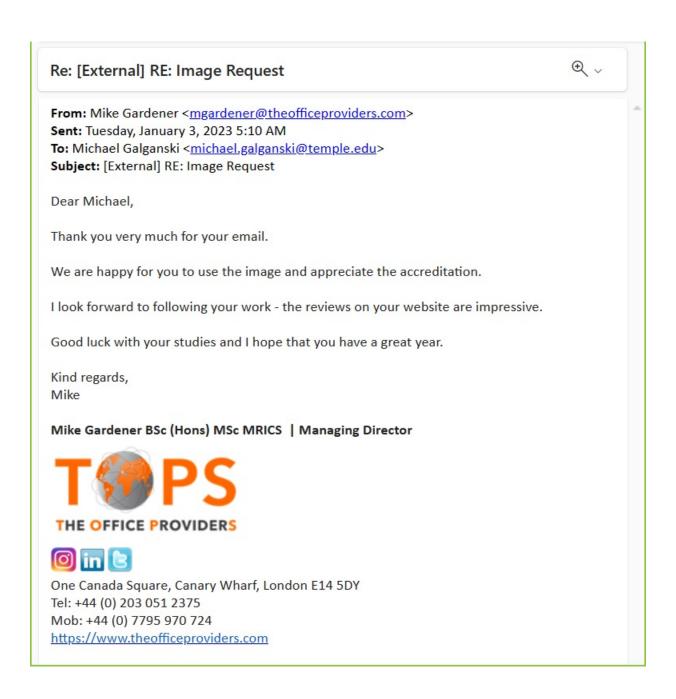


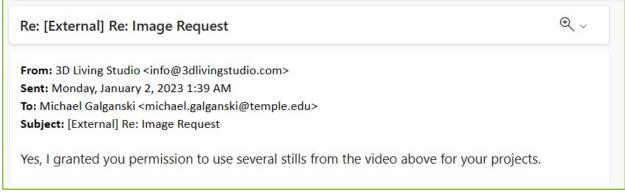
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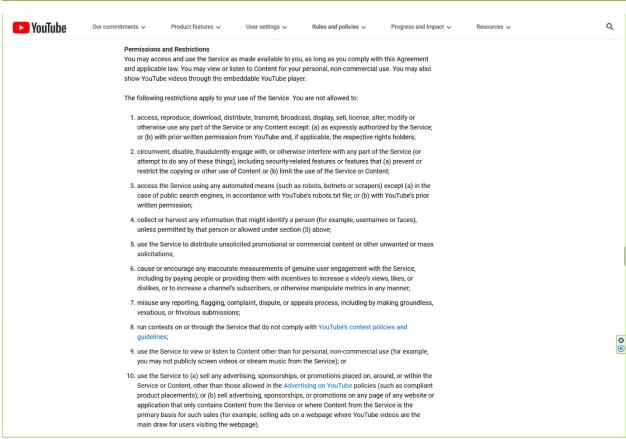
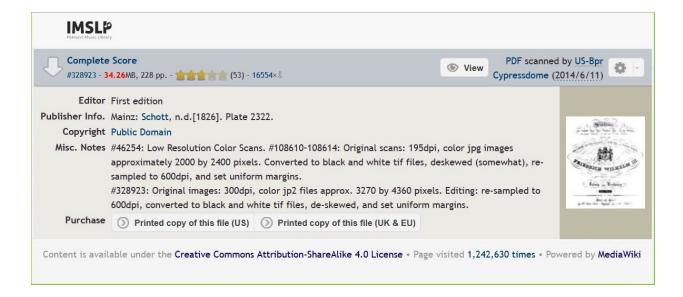


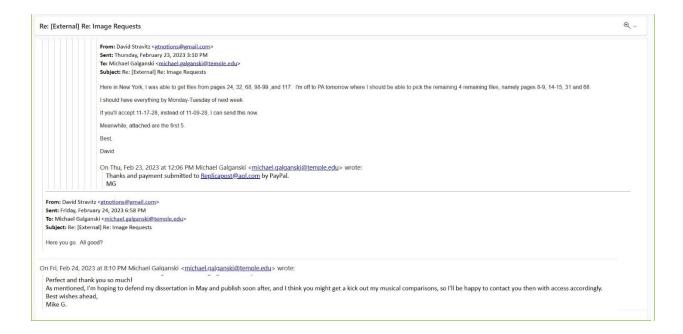
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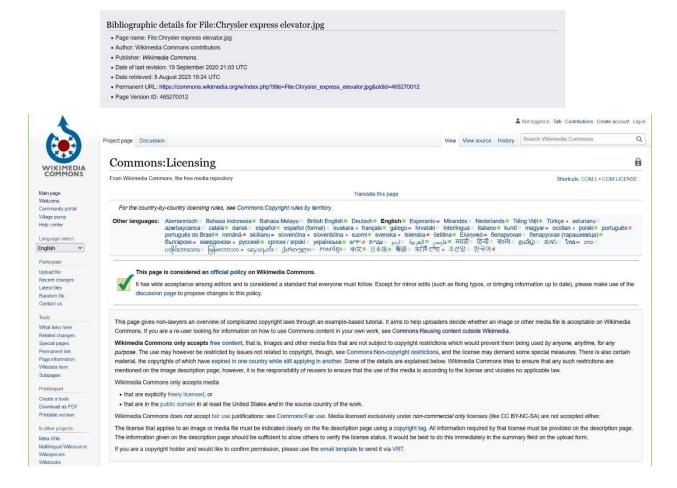


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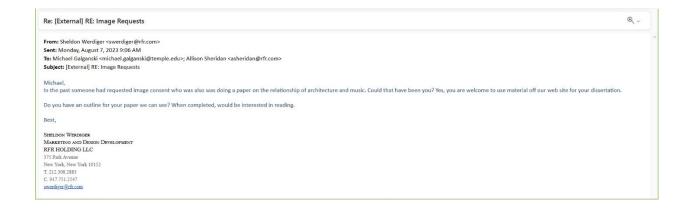
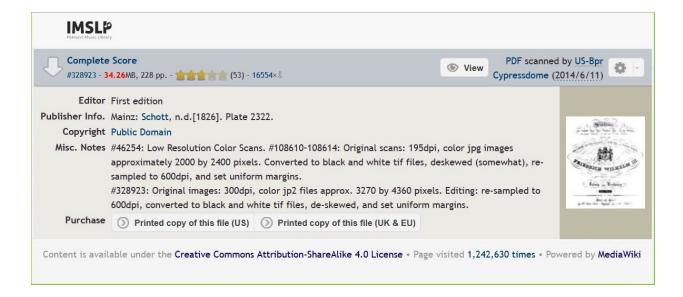


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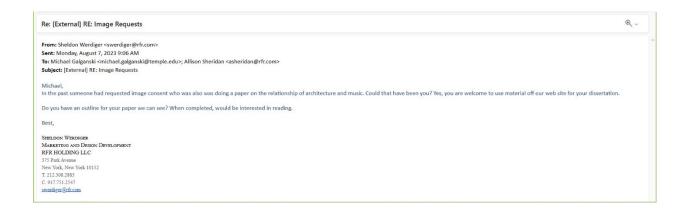
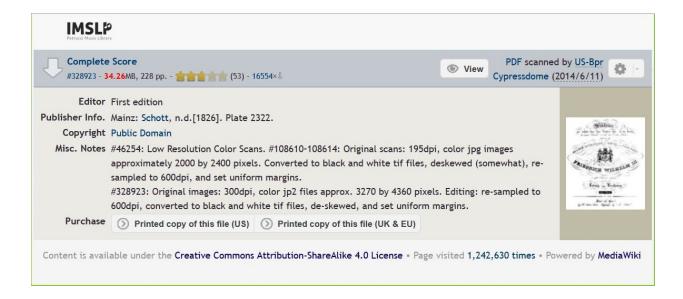


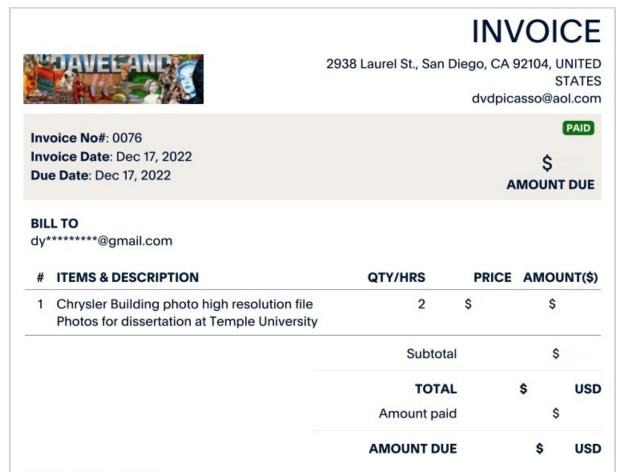
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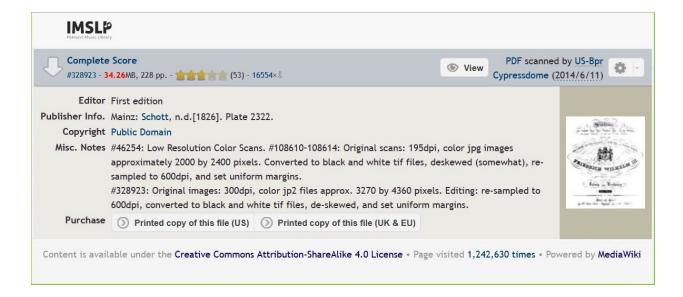
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AGREEMENT

DATE: August 8, 2023

Applicant: Michael Galganski Telephone #: 484-358-1968

280 #3 West Walnut Lane Fax:

Philadelphia, PA 19144 Email: array@temple.edu

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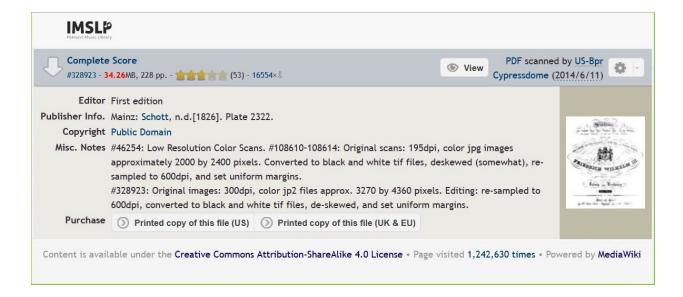


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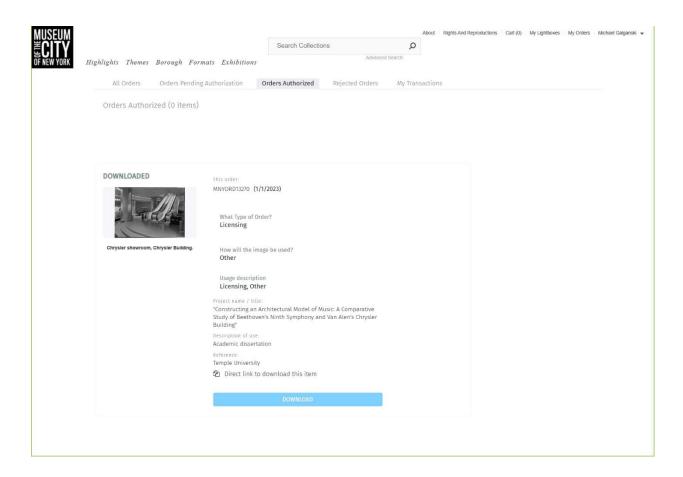


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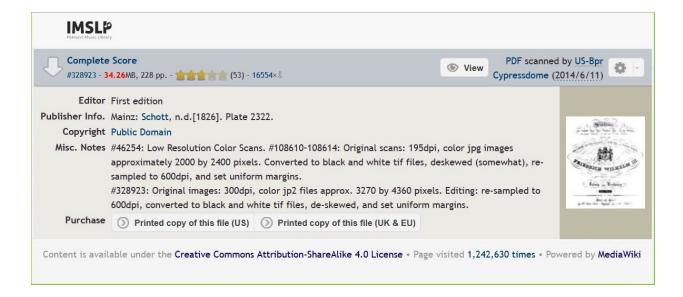


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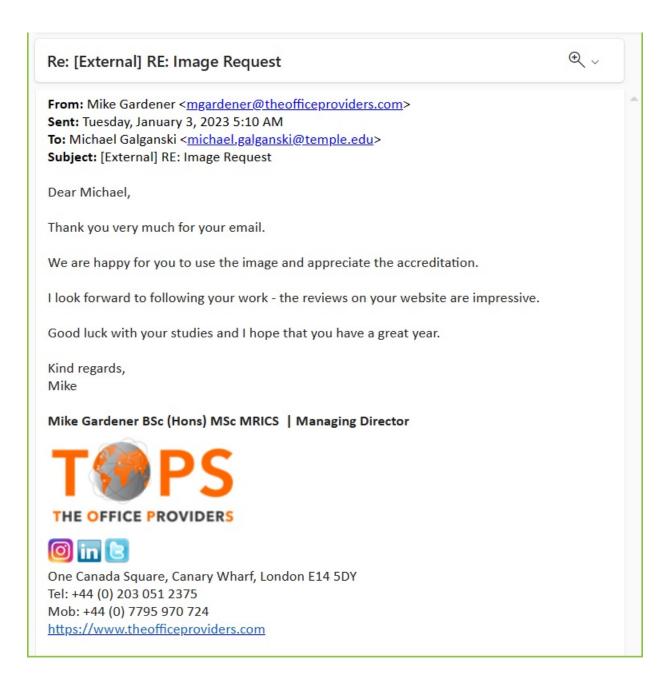


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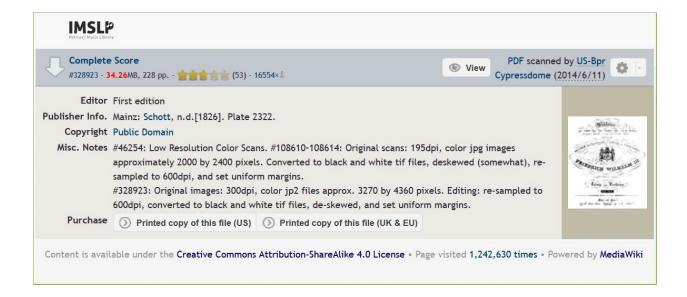


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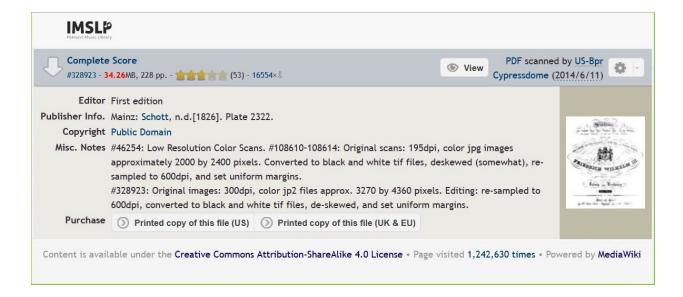


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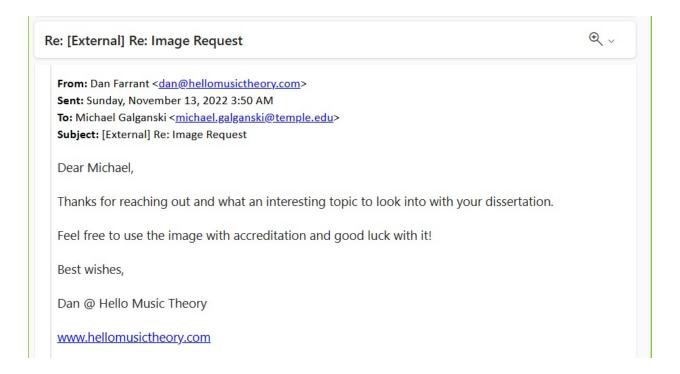
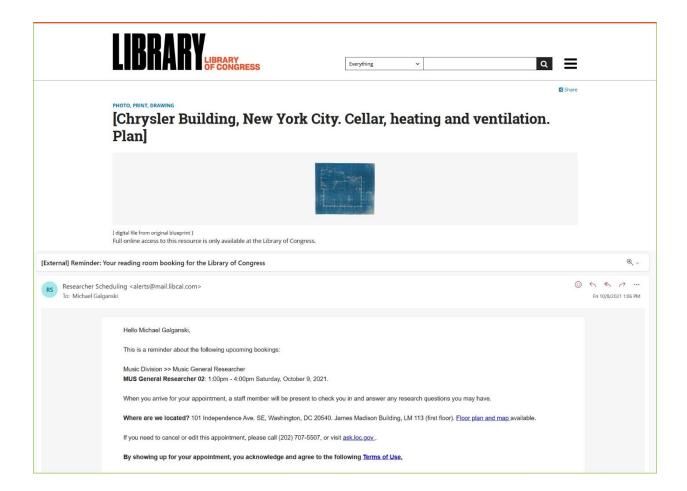


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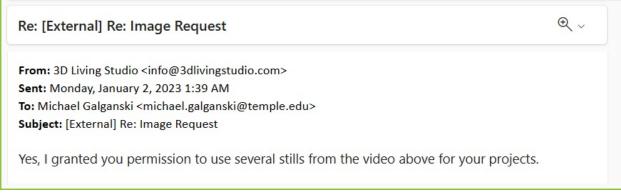
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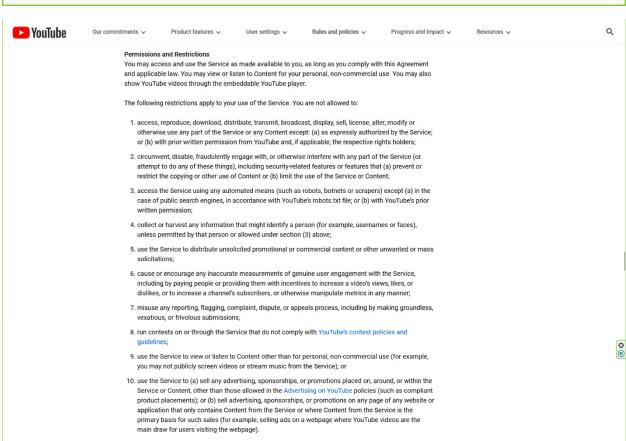


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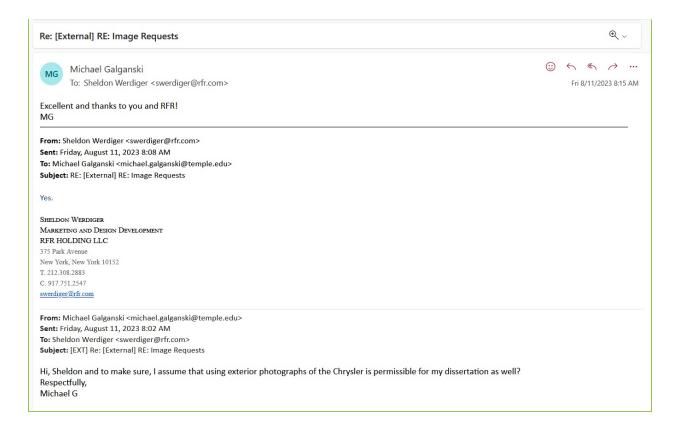


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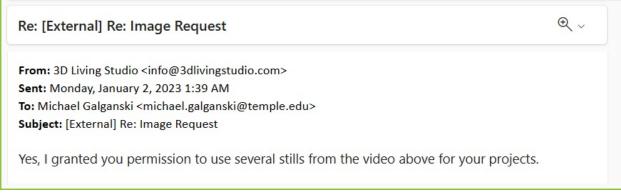
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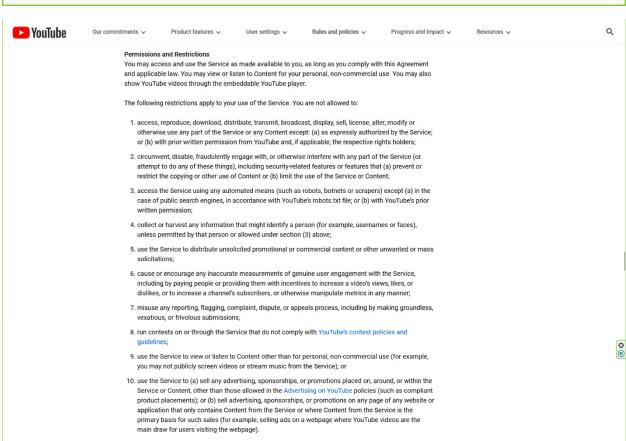
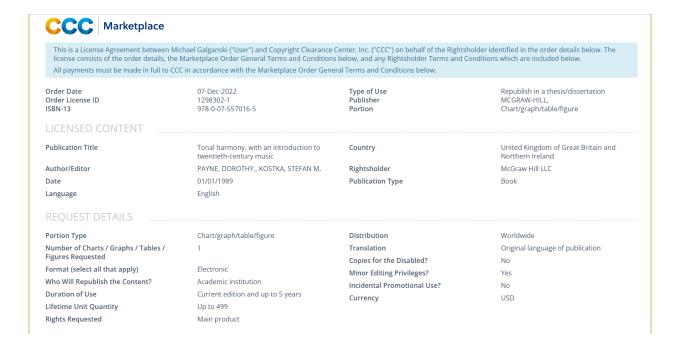


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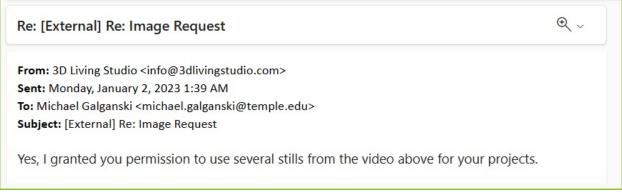
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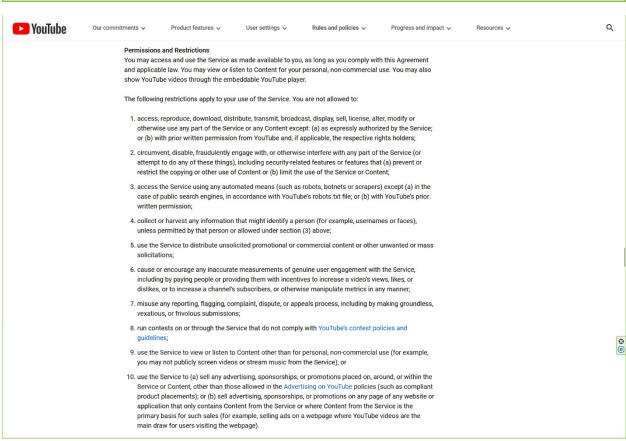


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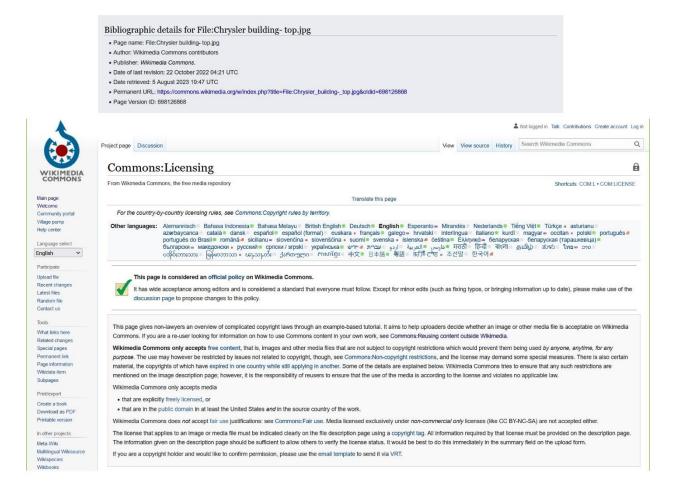


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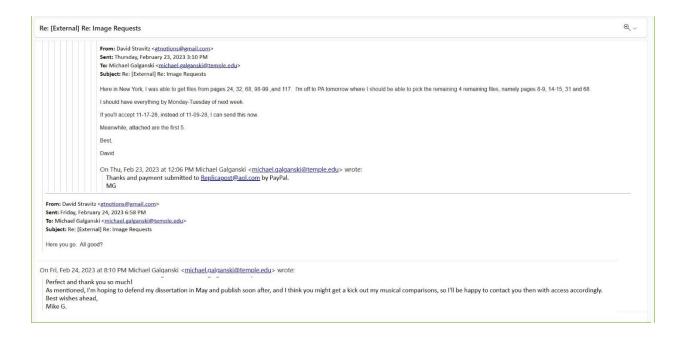


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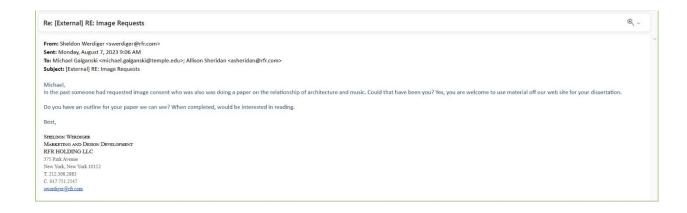


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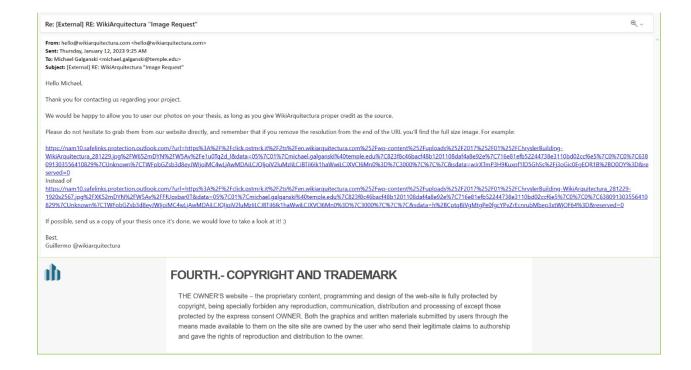


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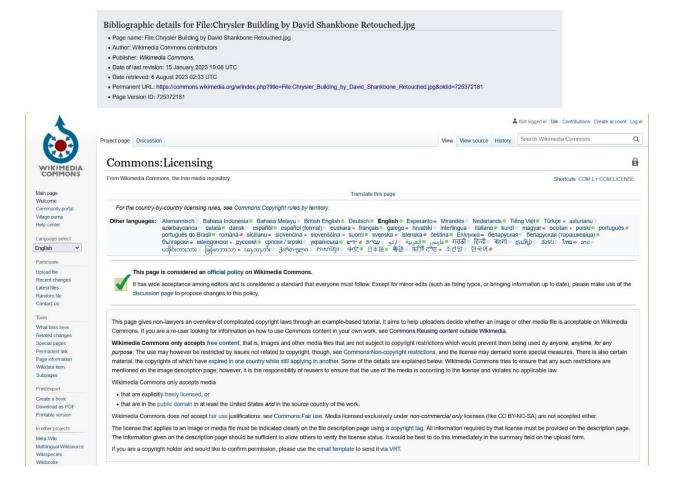
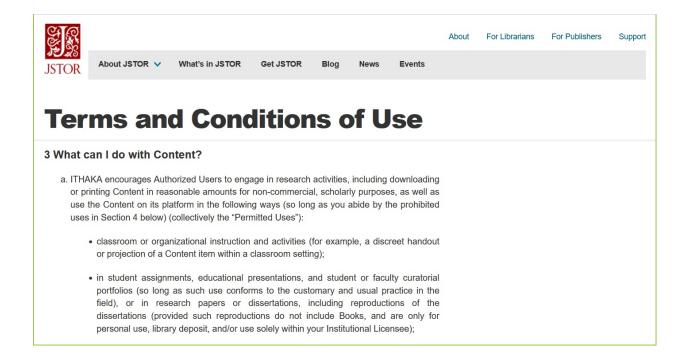


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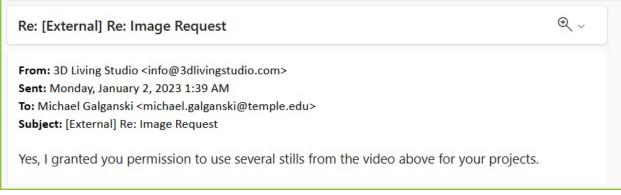
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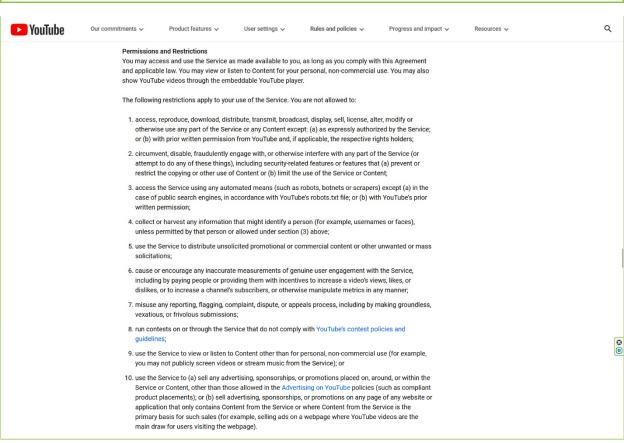


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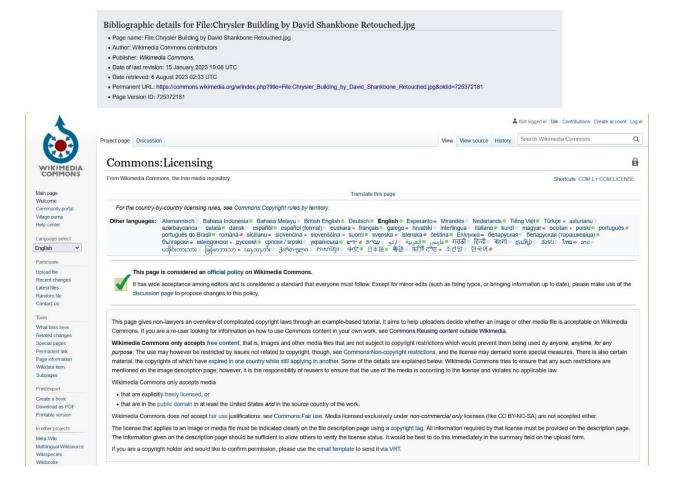
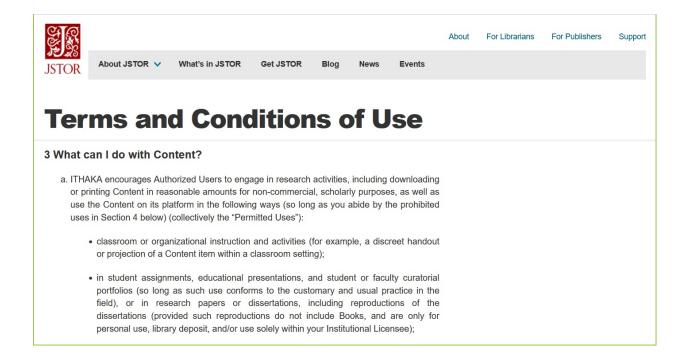


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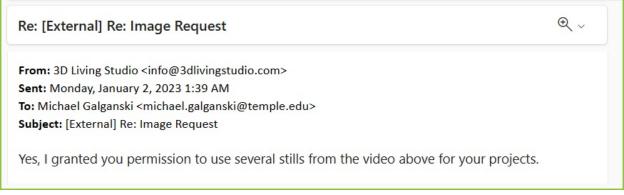
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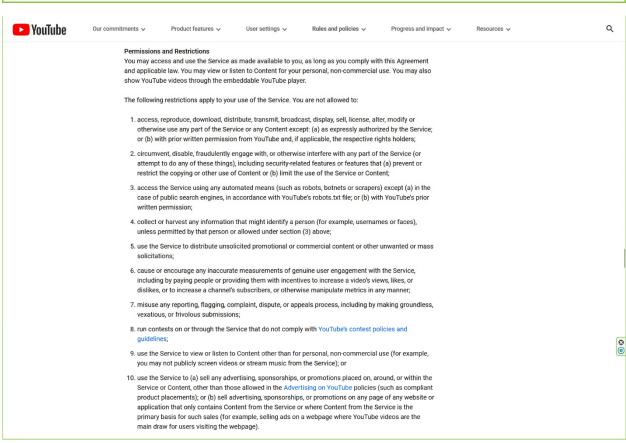


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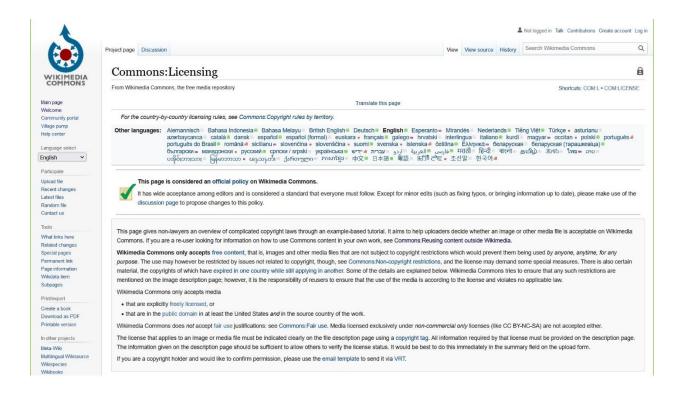


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September 12, 2023

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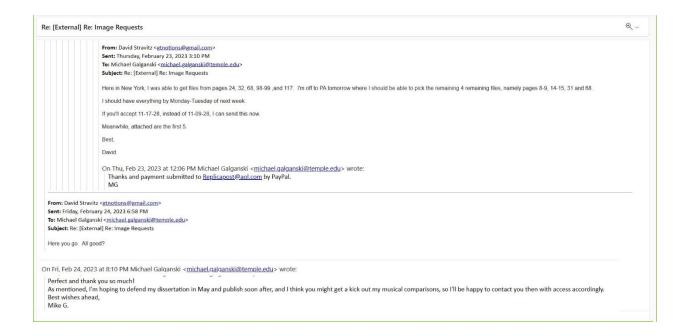
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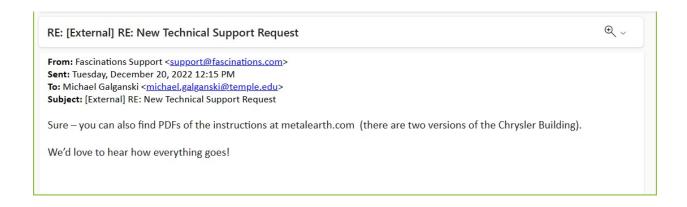
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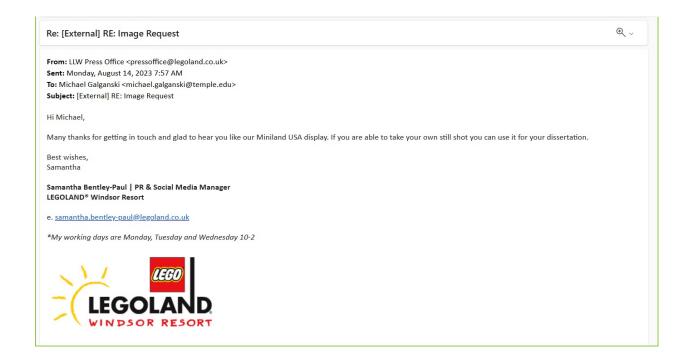
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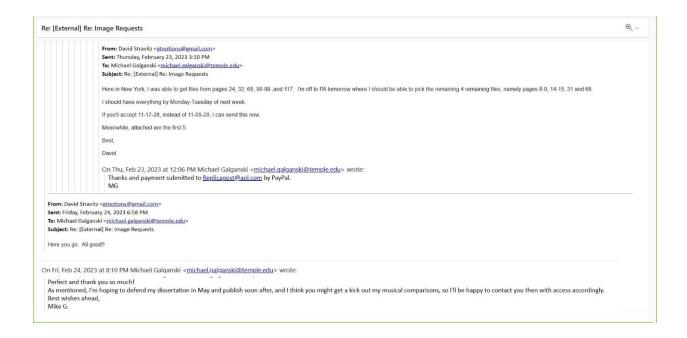


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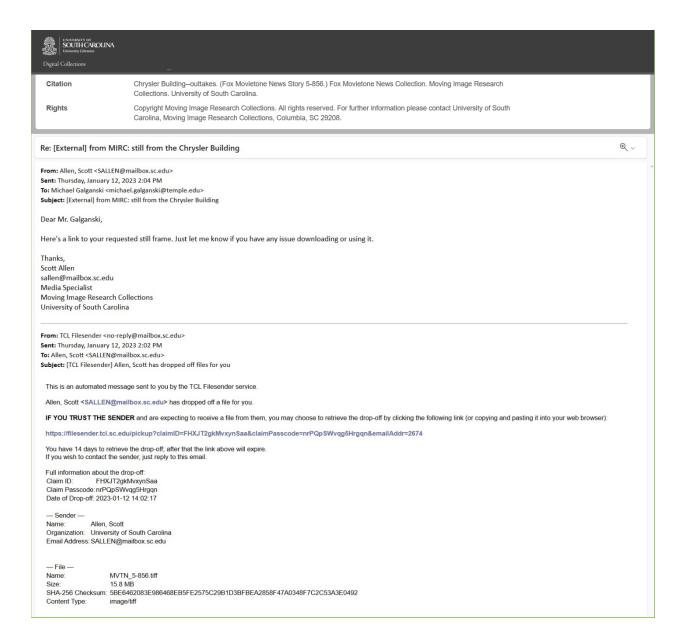


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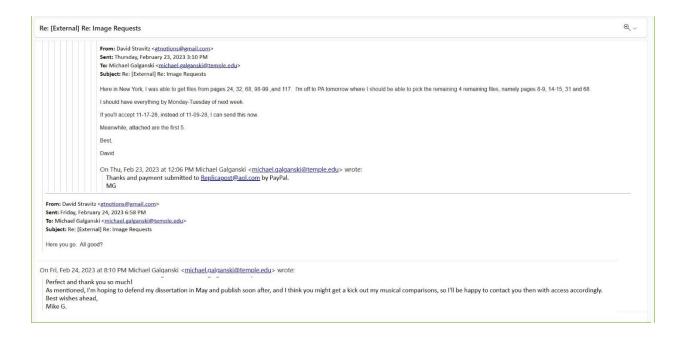
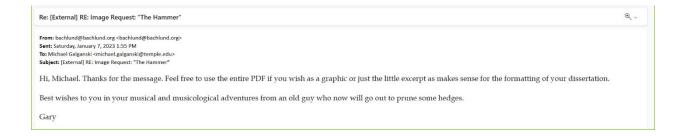


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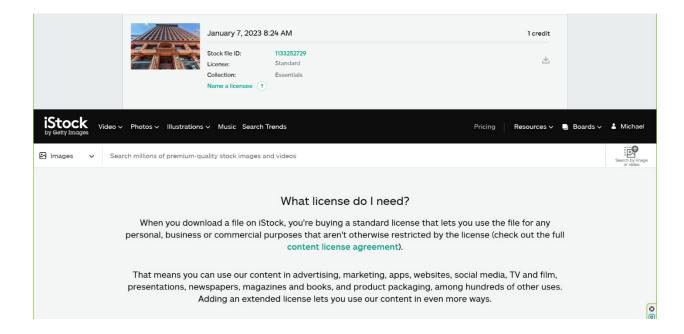
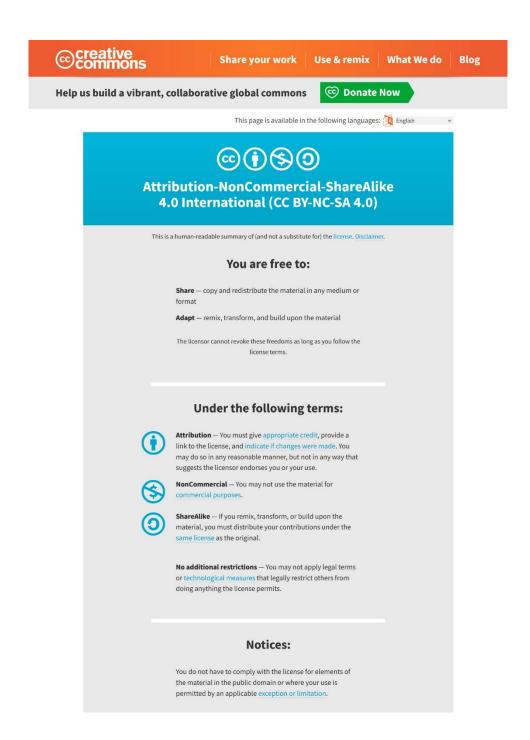


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