

# Jigs, Reels, and the Occasional Air: Utilizing Irish Traditional Music in the Fundamental Design Studio

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*Music is your own experience, your own thoughts, your wisdom. If you don't live it, it won't come out of your horn. They teach you there's a boundary line to music. But, man, there's no boundary line to art.*  
—Charlie Parker<sup>1</sup>

Artists have always explored the assumed limitations of their art. This is true for the sources of inspiration that fuel their creations, or the manner in which the work is generated. Architects have always found inspiration from within and outside the architectural world, yet how far does that inspiration propagate into the actual practice and education of architecture? Quite often the demands of any given career choice require that passions other than that of our primary occupations be forgotten, or relegated to weekend hobby, seldom to see the light of day through the garage door.

This sort of limitation can be quite frustrating in the arts when considering that the basis for much of western cultures' forms of art are quite similar in their inherent nature. We find in visual arts much overlap between the disciplines, finding at times expertise in sculpture and painting to be possessed by the same person. As architects and architectural educators we often find the study of the visual arts to be very beneficial to the design of the physical environment. Of course much of this is due to the graphic nature of the conveyance of our intentions: drawings. Drawing as a means to record our perceptions and work through an understanding of place, program, and space is the primary tool in architecture. Yet it does not convey our understanding of the world through senses beyond the visual.

Quite often one finds that the accepted boundaries of any profession can create a condition of resistance when there is an attempt to draw from sources of inspiration beyond them. As a designer and a musician I find myself frequently torn in two seemingly disparate directions. Not only is it inspiration that I draw from music, it is also a means of supplemental income other than that earned in practice and academia. Thus far in my career I have been able to achieve professional stature both as an architectural educator and a piper<sup>2</sup>. Yet as an architectural educator, I am determined to bridge the gap between these two pursuits in ways meaningful to the education of young architects and the profession.

While architectural design remains a predominantly visual field of study, our perception of the world involves a myriad of other inter-

connecting sensory experiences. Tactility and texture can be inferred visually, as can conditions of moistness and dryness. As influential in the design of the built environment as they are, taste, smell, and sound are not easy to graphically communicate. More often than not, the aural experience of the world is left out of the design equation. Unlike the visual arts to which there is little resistance in their utilization in the conception of space, there is much skepticism regarding attempts to bridge between them, the aural and architectural, the physical.

The educator has a responsibility to embark with the student on a scholarly journey of investigation and discovery, while providing the guidance and encouragement to ask questions and explore new ways of knowing the surrounding world. It is critical that the student and educator together expand intellect, process, and intuition, and learn to hone perceptual tools by questioning givens, doubting constraints, and challenging assumptions.

As complex and holistic of a tradition that it is, the discipline of architecture can be made more accessible to students if not clientele through analogies drawn from more familiar subjects such as art, music, cinema etc. Every one has had some relationship with music in their lives, whether lullaby, adolescent love song, or piano lessons. If this medium for expressing and remembering ideas and feelings can be tapped to convey both the intricacies of materiality and the broad cultural scope of architecture, we could better engage the students' minds and create young designers more prone to thinking outside the box.

As musical education has been proven scientifically to improve the cognitive development of students in other disciplines, the potential for improving perceptual and conceptual abilities in the creative arts is limitless. Looking to vernacular musical forms, one can gain insight into the cultural structure of a place perhaps more thoroughly than if one were to only consider the architectural vernacular. Parallels at the level of structural members, ornamentation, scale, color, texture, layering, narrative and context can be directly drawn between music and architecture. Further understanding these overlaps will foster a more enlightened view of the human condition, and what it means to practice architecture today. Thus, the proposal is that a study of the traditional Irish musical

vernacular will yield a unique holistic cultural and architectural understanding in the fundamental design studio.

### VERNACULAR MUSIC & CULTURAL MEANING

Traditional Irish music as it has been played for hundreds of years is utilitarian music for the people and by the people.<sup>3</sup> Traditionally tunes were transferred from generation to generation by ear, shared and learned by playing them in groups called “seisiuns.”<sup>4</sup> Thus, the identity of a specific tune’s author was lost over the years, and the music was allowed to evolve and grow each time it was changed. There is a complex system by which tunes are named and passed on that in the interest of brevity I will not elaborate on thoroughly. Suffice it to say that one of the primary attractions to utilizing this particular genre of music is that it is free of the whims and designs of any singular voice found in most other musical forms such as classical composition. What this means is that in essence the music can be understood WYSIWYG<sup>5</sup>, its inherent structure understood for just what it is without the necessity for comprehending a composer’s grander intentions.

This musical form was previously called “utilitarian”, which is not an entirely sufficient description. “Traditional music comprises two broad categories; instrumental music, which is mostly dance music (reels, jigs, hornpipes, polkas, etc.), and the song tradition, which is mostly unaccompanied solo singing but has come to include the transposition of *Sean nos* or old style singing to solo instrumental tunes called “Airs”.<sup>6</sup> The functionality of dance music is somewhat obvious, serving to provide a musical basis for community gatherings in traditional Irish culture, the dance. The primary purposes of the song and air tradition are to tell stories, to educate, or to commemorate. Thus the “programmatic” requirements of each type of music group is fairly clear, and can be further specified within each category. Within the dance music genre alone, reels, which are the predominant type of tune, are dances for couples, jigs are dances for individuals, polkas are Germanic dances for couples, and hornpipes are technical showpieces for male solo dancers.

The *raison d'être* of many musical forms tell quite a bit about the cultural values of a people or area. What stories are passed down from generation to generation, what tunes from what region are played, and what types of instruments are traditionally used demonstrate historically what economic, political, and technological values are in place at very specific places and times. Dance music prevalently brought people together to share political, social, and familial experiences and inevitably those experiences made their way into the tunes (tune names) and songs of the time. Young designers learn that meaning can be hidden in every aspect of any analysis, whether it is site-related, programmatic, historical, or cultural. Exposure to the subtle way in which cultural values shape the world is imperative in the education of those who will one day help create the physical environment.

The practices of architecture and construction bear many similarities to the practices of composition and musicianship. Not only

aligned as creative disciplines, the manner in which each profession operates is remarkably similar. The manner in which information is formulated, translated, and interpreted is only one of these professional similarities. Even the training and apprenticing commonly practiced or required of each is arguably consistent with one another. However professionally similar the practices may be, inherent to this study is a more extensive understanding of the structural ties that can bridge the boundary between what most would consider very different occupations.

### DRAWINGS/SCORES

The most striking and useful professional similarity lies in the methodology by which compositional intentions are conveyed from inception to completion. Simply stated, there is an intermediary stage from composition to construction and performance in the form of a document that outlines how ideas are to be made manifest. Either a set of construction documents or a score is necessary to outline the main intentions or rules of a composition. This either can be seen as a communicative recording or approximation of how the composer/architect anticipates his or her intentions to be constructed. This forms the basis for a dialogue between allied practitioners, architect and builder (contractor), or composer and musician (conductor).

In most of these relationships the ways and means of construction or performance are assumed the responsibility of the contractor or conductor, thus the dialogue carried forth by the transcription of intent leaves much room for expression and embellishment. The exact relationship and sequencing between various trades or instrumentations is determined by the contractor or conductor, allowing for and encouraging the expertise of each trade to improve upon the framework set forth in the construction documents or score. In the case of either architecture/construction or music, virtuosity of manifestation is essential to the timeless success of any project, as historic masterpieces of either discipline will demonstrate.

### PRACTICE, PRACTICE, PRACTICE

Virtuosity is encouraged and desired in the arts, including the practice of architecture or musicianship. Both disciplines use the model of practice as the primary vehicle to attain professional maturity. In the design studio (educational and professional), design projects are worked and reworked continually until a well-resolved solution is achieved (sometimes culminating in construction in the professional workplace). The education of an architect is based on much iteration of this process until an adequate mastery is attained, but only after much repetition of projects assigned in school, in internships, and over a period of time in practice often assumed to span decades. Many have been quoted to have hit their stride as practitioners in their late forties to sixties, and some continue to improve/practice into their nineties (i.e. Phillip Johnson).

One finds that the education of a musician requires a similarly repetitive model of continual practice and refinement often culminating in performance. Here as well, many are quoted as not achieving mastery until moderately late in life (i.e. Seamus Ennis, the famous Irish uilleann piper is quoted as saying it takes 21 years to become a piper: seven years learning, seven years practice, and seven years performing).<sup>7</sup> As in the discipline of architecture, students of the pipes traditionally begin their instruction with an instrument maker in their area. As proficiency was gradually gained, the student would serve as an apprentice to the maker, helping out in the shop. Mastery of the instrument coincided with the mastery of the craft; the apprenticeship often culminating with the production of the student's own instrument. This model has existed for hundreds of years.<sup>8</sup>

## INTEGRATION

The use of music in fundamental design studios is beneficial to introduce and encourage different ways of knowing the built and natural world. Perception of the relationships between parts is a skill essential to the practice of either architecture or musicianship. In regards to the perception of any given architectural problem, the practitioner must understand how multiple layers of context (each highly complex) connect with programmatic, budgetary, code, zoning, and structural requirements and come together to form a complete picture. Similarly, a composer must be able to bring together the various instrument parts (roughly seventeen in a modern orchestra), musical genre, *raison d'être*, etc. to form a complete composition.

I have begun using basic musical theory to introduce the aspiring architect to design. Starting with a beginning student's first design studio and into more advanced architectural studios, music has served a multiplicity of purposes all in the attempt to both expand upon the student's prior life experiences and to demonstrate basic design and interpretive skills without the necessity to jump directly to buildings. It is the fundamental understanding of formal relationships (as can be found in music), connections, layering, hierarchies and space-time that one must start with in an architectural education. Perhaps a non-building based curriculum can introduce the tenants of architectural design and help design a highly effective methodology of perception and conception without the aforementioned jump.

## PART TWO

### Vernacular Musical Form

Irish music is a melodic musical form with little harmony if any.<sup>9</sup> Tunes are composed as sequences of individual tones (notes) with varying distances between and different time values. The melodic form can be abstractly thought of as a single line of notes, similar to just the right hand of a piano piece without chords. All players even in large ensembles play or attempt to play the same sequential

set of tones (notes). The different range of different instruments including in what pitch and octave they are played adds depth to the tunes.

Tunes transcribed or orally passed between players are mere bare bones of that tune, allowing for much variation from person to person and performance to performance. Every performer will perform a specific tune differently, expressing the music in their own uniquely interpretive way.<sup>10</sup> Divergent applications of ornamentation and harmony allow for the music to change every time it is performed, while the melodic structure itself remains constant. Similarly, any architecture problem can produce an endless stream of solutions with equal clarity. Variation and interpretation (both encouraging individual creativity on the part of the student) can then be grasped fully, and the benefit of multiple solutions illustrated quite clearly.

Very often a constant underlay of tone is present, called a drone. This constancy is also present in various other musical forms, including not coincidentally northern Indian and Middle Eastern music (origins of the bagpipe). The Drone provides a tonic wavelength into and out of which other tone's wavelengths converge. It is created either by a dedicated drone pipe of the bagpipes, by continually bowing a string on a fiddle, or by holding a key on the accordion. The drone can be seen as a groundplane or context against which the melody takes place.

The time signatures of specific types of traditional tunes are constant. Various types of jigs, for example, use time signatures of 6/8, 9/8, and 12/8 (referring in 6/8 time to six quarter notes per measure of music). Reels all use 4/4 time (four quarter notes per measure), and so forth. These strict time signatures and the tune types associated with them allow for all players to play tightly together, even those new to a particular seisiun. As previously mentioned, each of these tempos corresponds to different types of dance, whether solo, duo, or mass. Demonstrating the specificity of each time requirement can be analogous to the programmatic requirements of a project, such as those prescribed by building codes, ADA, zoning, etc. It is of obvious importance to illustrate early in an architectural curriculum that project restrictions are not only important to observe but can also be exploited in positive ways as design determinants.

This particular musical form is ancient, highly structured but constantly evolving, anonymous but uniquely named by its different practitioners over generations, and tightly comprised but with sometimes very elaborate ornamentation. Irish music and similar musical forms are melodic, diatonic, highly rhythmic, with an accompanying drone but with little if any harmonics.

This diatonic structure, which predates much of western music, (most likely rooted in early Chinese and Greek vernacular musical forms<sup>11</sup>) is straightforward enough for students to easily understand the tonic relationship between notes without the necessity of introducing a lot of musical theory. There are usually only two octaves of possible notes in any given tune, with a maximum of 15 diatonic tones or notes with only two standard semi-tone variations (charac-

teristic of either the key of D or G).<sup>12</sup> This rigid structure limits the otherwise great expressive nature that such musical studies can possess, and requires that precision and constant modules of construction be utilized. This sort of restraint would otherwise be a difficult concept to convey to students, particularly those beginning their architectural education.

### Design Studio Methodology

This proposal aims to combine experiential translation of musical form with compositional translation of musical form in such a manner as to create a relatively different understanding of space and structure. Once the student masters the transformational process, particularly the translating of perceptions into abstract form, it can be repeated using any urban, suburban, or rural context in place of the Irish musical context. When a physical site is reconstructed using this transformational methodology, the intricate layers extracted from the existing qualities and characteristics of the site can be used to form the conceptual framework within which architecture can be placed.

This methodology focuses on a system of translations that allow for context and content to be read, scrutinized, and reconceived. Existing streetscapes are subject to specific patterns and intervals of party wall and aperture spacing, as well as the spaces carved by streetscapes. In the end, students can be taught to diagram any physical site and its context using this abstracted musical theory and its accompanying notation. The substitution of vernacular music for vernacular architecture allows for context to be understood in abstract, precise layers of structural interpretation free initially of loaded architectural and cultural meaning. While essential to eventually comprehending all aspects of the world within which the students will work and live, the meaning to the components of a streetscape can overwhelm the beginning architecture student. By first focusing on the physical existence of a place and gradually digesting the determinants of that particular existence through abstraction and distillation, the student can better organize this information into a prioritized set of design intentions.

Once this basic structural system is understood abstractly, it is then possible to introduce a non-building design process by which the aural construction of the music is then systematically made into a physical construction. In essence what is being taught, is the systematic and interpretive method by which any component of an architectural problem can be fully analyzed as individual layers of determinants and as a gestalt. Any architectural site urban, suburban, or rural can be studied and transformed abstractly in the same fashion as music. Once the student learns the process, it can be recreated and reapplied throughout their careers to fully understand a set of conditions so that they can work within them appropriately.

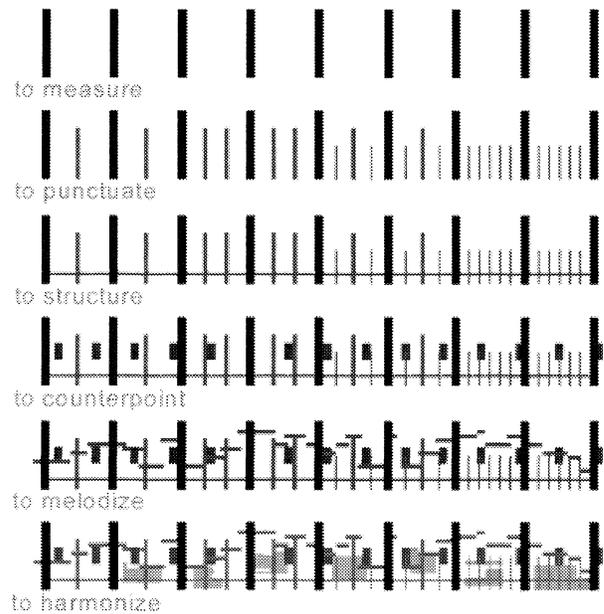


fig. 1: Verb List. Drawing inspiration from the work of Richard Serra, strategies were derived to translate from music to architecture.

Transformation from music to architecture is accomplished primarily through a decoding system. Equivalent compositional elements are assigned to one another across the disciplinary boundary in an initial attempt to structurally create a physical and spatial manifestation of the musical composition studied. What was once aural can now be made physical by breaking it down into its specific systems and parts.

The uniqueness of this proposition lies in the utilization of this very strictly structured traditional musical form to derive (without the dependence of buildings) basic architecture composition: space, structure, material, context, connections, and layering. Most studies to date have dealt with composers who very deliberately used design strategies common to the visual arts and architecture (i.e. Bartok and Mozart with their use of the golden mean)<sup>13</sup>. This study looks to the vernacular form that music, like architecture, can take over centuries of accretion and amalgamation. The tenants of fundamental architectural design that this approach fosters are elementary composition, structure and meter, layering and connections, in conjunction with an abstracted palette of contextual existences for any architectural project. Any context can be analyzed in this fashion, whether it is of deliberate form or a more organic nature.

### Studio Project

This is a three-step translation from analysis, to abstraction, and finally design. The process begins with the analysis of one of the aforementioned traditional musical forms, either an air or jig. The above list of translating terms allows for first a drawing and then a model of the particular tune to be created. Using the quarter note or quaver as the primary structural meter of the tune, we equate a standard construction module of 48 inches. Any material or structure system at this fundamental educational level will be divisible by this module. Of course, it can also be broken into three modules of 16 inches, four modules of 12 inches, two modules of 24 inches, and so forth.

The most difficult term to equate between music and architecture is the essential building block of each. What is architecture in its most primary form but the shaping of space? This is of course a flagrantly broad assertion, but for the purposes of fundamental design education it works. The same question when posed to music has to achieve an answer of sound. In fact, many music teachers use space as a metaphor for how to play. Anne Santoro, a former Carnegie Hall performer (clarinet) states that she was taught to play expressively in spatial terms. Certain passages of pieces would require her to fill a vertical space, as in a cathedral. Other times, she was encouraged to play to one side or the other in a more horizontal manner. While it may be impossible to understand this technique fully, suffice it to say that the connection between the spatial and the aural is not completely novel.<sup>14</sup>

Students are first asked to discern the space occupied by the tune, following the melody line as it climbs and descends in section, first documenting the space created by the melody, and then the detailed relationships within the melody. The relative distance between each tone corresponds to a similar sectional change as the tune is drawn to scale. Legato and staccato describe a connected transition from tone to tone and a separated transition respectively. The idea of these tonal connections and the practice of ornamentation occurring between and separating tones can be ascribed then as how each element on the page relates to others.

The tempo or time of the tune is measured using the 48" construction module as a basis for a structural grid to be drawn. As described before, specific types of tunes have very specific timing. This corresponds to the number of notes or beats that will occur in equal divisions of the tune. For example, the double jigs that students worked with have a time signature of 6/8, meaning there are six eighth note beats to each measure of the tune. Variations within this occur allowing for quarter notes to take the place of two eighth notes (commonly called quavers), or dotted quavers taking the place of three eighth notes, and so forth. This adds variation to the tune, and in the case of a double jig, an emphasis to certain parts of each measure of music. How each note or tone then aligns to the structural grid then creates different conditions of overlap and synchronicity. Translated architecturally, relationships between the spatial unfolding of the music can express the structural grid, or deviate from it accordingly.



fig. 2: *Sliabh na Mban*. A traditional Irish Air transcribed from the playing of the author (learned from fiddler Kevin Donleavy)

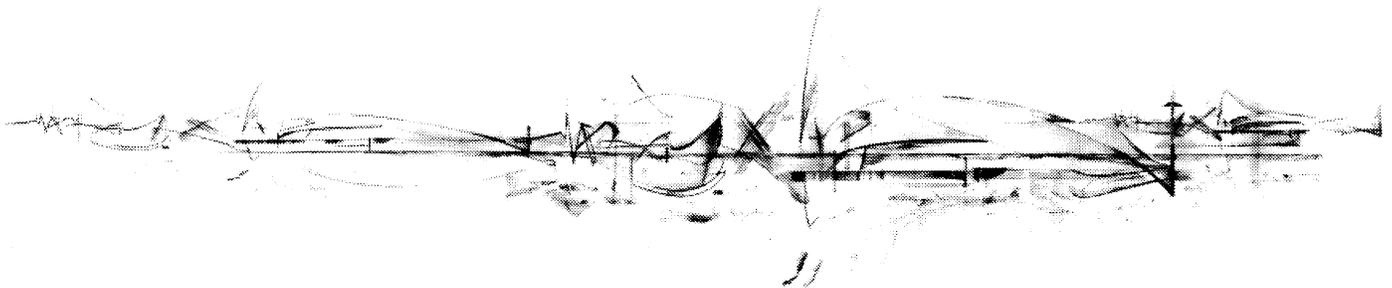


fig. 3: *Sliabh na Mban*. First step of translation is the section. Drawing by Peter DePasquale

Further structural characteristics beyond simply the melody and tempo must also transform in order for sufficient complexity to be achieved. While relatively infrequent in traditional Irish music, harmony affords the possibility of further layering to occur, whether it is spatial or formal. Logic dictates that as the melodic translation results in spatial articulation, then as harmony is fundamentally a secondary or tertiary melodic layer, then it too should translate as spatiality. Depending on the relative tonic relationship between the melody and the harmony at specific points, the harmonic spatial layer can occur parallel to, oblique to, tangential, or within the primary melodic spatiality. Whether the melodic tone and the harmonic tones are in or out of phase can determine whether there is a volumetric connection between the two (or more) spatial constructions. This process can continue to encompass as many layers of translation as desired, and can be taken to as small a detailed level as appropriate to the level of students involved.

After every additional aspect of the students' observations is conveyed to paper, the tune must again be analyzed in order to extrude or interpret the drawing into the third dimension. The diagrammatic tunes are then given volumetric sustenance and built as abstract armatures of limited materiality. Students are encouraged to not uniformly extrude the tune from the paper as a base, but instead to work simultaneously with negative and positive heights for elements. Similarly, elements on the paper are allowed to remain as additive elements in the built armature, or as voided elements, as long as there is consistency to the logic. One method of determining what is additive and subtractive is the defining of a datum extracted from the music itself. For example, the particular tone that separates two octaves can serve as the datum, placing the lower octave below this level and the second octave above. Tones in phase with the background drone can be treated as either additive or subtractive, while tones out of phase can be treated as the other. The importance is that the student interprets a system of prioritization, and uses it consistently throughout the development of a project.

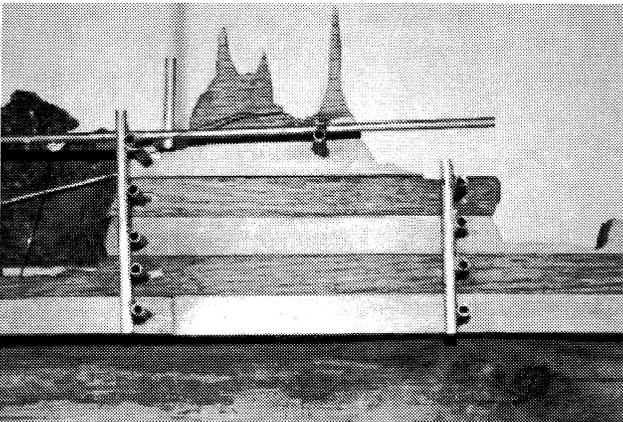


fig. 4: *Sliabh na Mban*. Detail from model of *Air*. Model by Elizabeth Magalis.

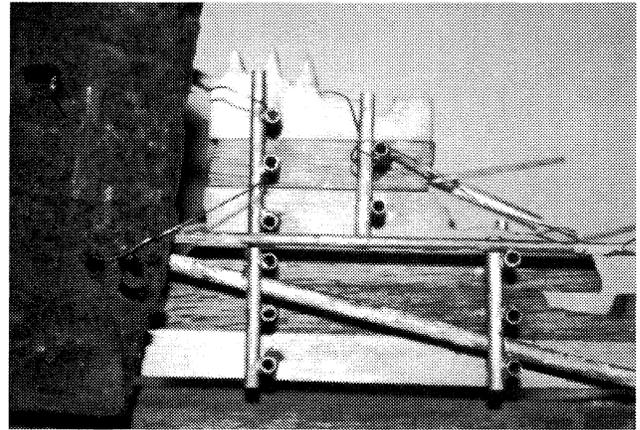


fig. 5: *Sliabh na Mban*. Detail from model of *Air*. Model by Elizabeth Magalis.

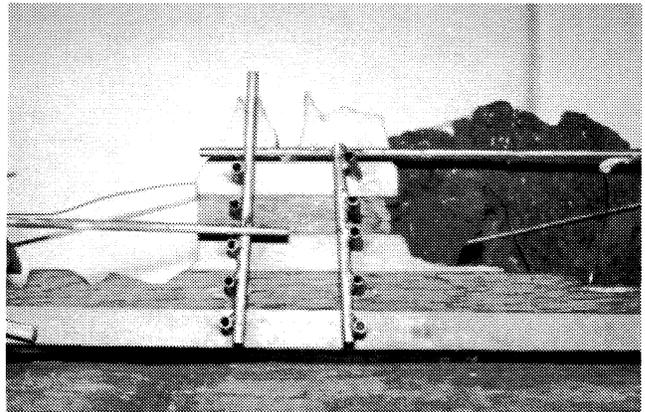


fig. 6: *Sliabh na Mban*. Detail from model of *Air*. Model by Elizabeth Magalis.

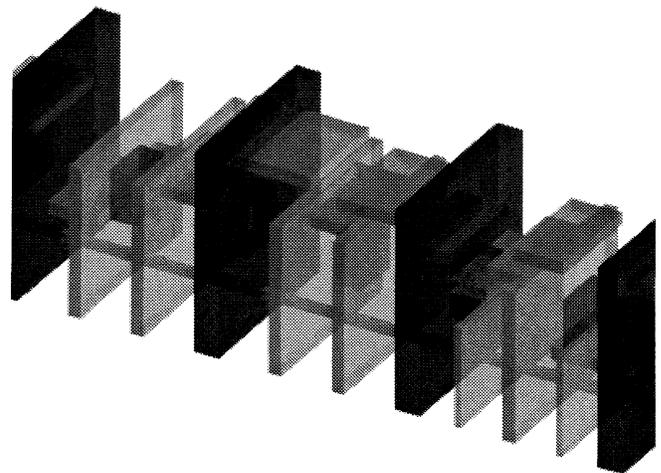


fig. 7: *Sliabh na Mban*. Detail from digital model of *Air*. Model by author.

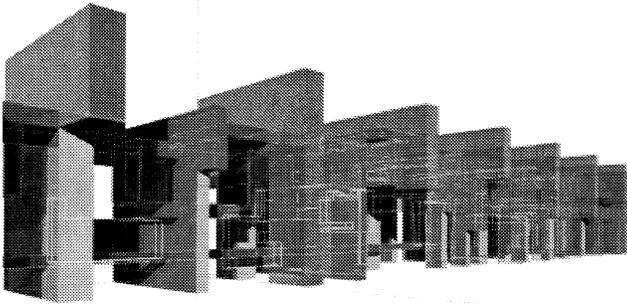


fig. 8: Sliabh na Mban. Detail from digital model of Air. Model by author.

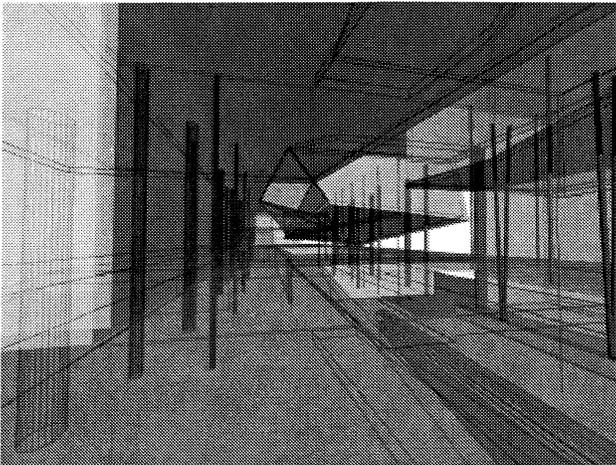


fig. 9: Sliabh na Mban. View through digital model of Air. Model by Pete DePasquale.

Students are asked to decide how to attach the various layers of their constructions to one another, using rules that they have developed in drawing the relative relationships between notes and notes, notes and the beat, between the melody and any harmony, etc. One method for attachment utilizes the notion of melodic ornamentation, “extra” notes added to a tune in order to separate two like notes when playing legato style, to express or draw attention to a specific passage, or to add a texture to the music unique to traditional Irish music. In many cases, a highly evocative tectonic is developed that can serve as a basis for the next step of the translation.

The tune armatures are then recreated on the computer, allowing for space to be sculpted within the material solids. Using form Z as our digital modeler, students constructed their armatures digitally, ascribing material thickness to each element. What was treated as a solid element in the physically built armature now becomes volumetric with membrane thickness. Since passage through the constructions is now possible, an architectural procession can be

mapped through the projects, and space can be hierarchically gradated from public to private, thus continuing to ascribe specificity to the spaces and allowing for further “inhabitation.” Using the walkthrough capabilities of the program, students can now study how spaces connect and flow into and through one another, and can continue to design the details of thresholds between disparate layers.

In the end, one can virtually occupy the tune as one would occupy a building, but without the imposition of preconceived ideas of windows, doors, stairs, etc. This allows for the design to remain in an abstract, conceptual stage and encourages the avoidance of default architectural (or building) elements being imported into the project. The transformation from concept to physical manifestation also allows for relationships between seemingly disparate elements of a design problem to be discovered and exploited positively. Unfamiliar subject matter in a project’s determinants can be made comprehensible through this process, enriching the students’ collection of design determinants. Complexity and contradiction can be understood and commandeered within any contextuality, further opening up the possibilities for new avenues of architectural investigation. The translations are intended to operate experientially and compositionally in the students’ designs.

Dissecting a subject in this fashion is beneficial to understanding both the compositional and the gestalt nature of the perceivable world. Architecture, the amalgamation of endless determinants, ideas, ideals, trades, constraints, restrictions, and endless frustrations can be embraced as a very fruitful and positive way of experiencing life. By simply learning to think of the world in more holistic terms, not singularly as an architect, musician, doctor, or carpenter, but as a complete human being, and by enthusiastically imparting this open attitude to our students, we can positively address conditions of restraint in the profession and in academia, while ensuring the success of future generations of practitioners, clients, and teachers.

## NOTES

<sup>1</sup>Horovitz, Michael Children of Albion: Poetry of the Underground in Britain, “Afterwords,” set 3, Columbia Dictionary of Quotations, Columbia University Press, 1969.

<sup>2</sup>As a member of the National Uilleann Piping Society of Ireland (Na Piobairi Uilleann) and the newly founded Arizona Uilleann Piping Society, I have been able to publish internationally an article about the instrument as well as participate in various international conferences and gatherings. As rare as uilleann pipers are (only a handful documented in each state in the USA) I have been able to gain a reputation as a piper and teacher in Virginia.

<sup>3</sup>Manuscripts dating back to 1171 during the reign of Henry II document the existence of Irish musical form similar to what is presently known as traditional Irish music. Further evidence demonstrates that it is relatively unchanged since the dark ages.

“The attention of this people to musical instruments I find worthy of commendation, in which their skill is beyond comparison superior to that of any nation I have seen, for in these modulation is not slow and solemn, as in the instruments of Britain, to which we are accustomed but the sounds are rapid and precipitate, yet at the same time sweet and pleasing...delight with so much delicacy, and soothe so softly that the excellence of their art seems to lie in concealing it...” Flaherty, Bernard, Trip to Sligo, Purcell Print, Boyle, Co. Roscommon, 1990, page 1.

<sup>4</sup>The term “sesium” is the Irish term referring to a frequent gathering of musicians. The English term “session” as in “jam session” very likely is based on this word.

<sup>5</sup>WYSIWYG is the computer anagram for “what you see is what you get” referring to a variety of software relying on intuitively based graphic tools to input data rather than the input of data in text or code form.

<sup>6</sup>Carson, Ciaran, *Irish Traditional Music*, The Appletree Press, Ltd., Belfast, Northern Ireland. Page 5. This small but prolific guide to Irish Traditional Music focused not only on the instruments and structure of the music, but on the historical and sociological meaning of it.

<sup>7</sup>Seamus Ennis was quoted as saying this about the education of a piper. Ennis was a prolific collector of music and folklore, and is considered the master of Irish traditional music as a singer, dancer, whistle player, and above all a piper. While there are various sources for the quote, I refer again to Carson’s *Irish Traditional Music*, page 16-17.

<sup>8</sup>Even now master pipers and pipemakers such as Davy Spillane, Seth Gallagher, and Kevin Rowsome carry on this tradition. They are only three examples of pipemakers, teachers, and performers continuing with the traditional model of apprenticing with a master, often a father or grandfather. There are many such examples too numerous to thoroughly cite throughout the recent history of traditional Irish music. However, the point is that this relationship between master and apprentice, between practice and education exists nowhere more clearly than in architecture and music.

<sup>9</sup>There is very little harmony (tonic combinations that share converging and proportional wavelengths resulting in a pleasing sound) with most Irish musical traditions. Most practitioners in fact discourage harmonic accompaniment, although some rare instruments actually can accompany themselves (melodeon, accordions, uilleann pipes). Over hundreds of years, Irish piping tradition, for example, has developed a bagpipe that allows for a melody to be played with the hands, harmonic chords to be played with the wrists, and a constant drone to be played via a complex system of reeds, valves, and pipes. As in most Irish music, the melody is the focus of the piper, but at times the piper can in essence accompany him or herself. This can be performed with the wrist keys to create harmonic chords, a second melody, or a “vamping” contrapuntal rhythm of tones in synchronation with the primary melodic structure of the tune. Thus a simple melodic structure can become quite rich with complexity and contradiction the more a tune is explored. Vamping refers to the utilization of harmonic chords or single notes in a rhythmic manner to add texture or momentum to a tune, specifically by an accordion player or a piper. Finbar Furey is famous for this technique which he acquired from the playing of Johnny Doran, Patsy Touhey, and Seamus Ennis. When asked why he played as fast (referring to both the chanter and vamping) he often replied “Because I can.”

<sup>10</sup>Gil Hocker, noted American uilleann piper states quite clearly that it is the ornamentation that is the essence of Irish music. While I am not in full agreement with Mr. Hocker, the unique ornamentation of the uilleann pipes does distinguish them as a very mellifluous, evocative instrument. Various instruments have different “paths” between notes, and thus different ornamentations or embellishments that can occur between notes differ from instrument to instrument. Some ornamentation has a specific syntax universal to all instruments. Similarities in texture and time can exist between instruments, but some are very unique to specific instruments. Some experts argue that the essence of Irish music lay in the ornamentation, but others maintain it is the strict rhythmic quality that is its beauty.

<sup>11</sup>Irish music is diatonic in nature (composed in a key based on an uneven progression of whole tones and semitones), as opposed to chromatic (com-

posed in a key based on an even progression of semitones alone). It is thus conceivable to spatially understand a melody as a sequence of specific intervals with highly specific dimensions (spacing). Every tune is made up of the exact same notes with very little variation. This diatonic scale for reference is invariably either D or G (denoting the bottom note of the scale). Bernard Flaherty writes in *Trip to Sligo* (Purcell Print, Boyle, Co. Roscommon, 1990, page 1) “These gapped scales are said to have their origins in ancient China and even Pythagoras, the Greek mathematician, is considered to have been the originator of one such scale.”

<sup>12</sup>Flaherty, page 2.

<sup>13</sup>May, Mike, “Did Mozart Use the Golden Section?”, *American Scientist-March-May 1996* (<http://www.sigmaxi.org/amsci/issues/Sciobs96/Sciobs96-03MM.html>). “In the October 1995 issue of *Mathematics Magazine* (68(4):275-282), Putz described his investigation of whether the golden ratio appears in Mozart’s piano sonatas. According to Putz: “In Mozart’s time, the sonata-form movement was conceived in two parts: the Exposition in which the musical theme is introduced, and the Development and Recapitulation in which the theme is developed and revisited.... It is this separation into two distinct sections ... [that] gives cause to wonder how Mozart apportioned these works.” That is, did Mozart divide his sonatas according to the golden ratio, with the exposition as the shorter segment and the development and recapitulation as the longer one?

Putz represented the two sections—the exposition and the recapitulation and development—by the number of measures in each. In the first movement of the Sonata No. 1 in C Major, for instance, the exposition and the recapitulation and development consist of 38 and 62 measures, respectively. “This is a perfect division,” Putz writes, “according to the golden section in the following sense: A 100-measure movement could not be divided any closer (in natural numbers) to the golden section than 38 and 62.” An equally good approximation to the golden section exists in the second movement of that sonata. The third movement, however, deviates from the golden section.

A clear answer to Putz’s question required looking at more than one sonata. So Putz examined 29 movements from Mozart’s piano sonatas—the ones that consist of two distinct sections. Then he plotted the number of measures in the development and recapitulation versus the total number of measures in each movement, which is the right side of the golden-section equality as given earlier. The results reveal a stunningly straight line—so straight that its correlation coefficient equals 0.99, or nearly the 1.00 of a perfectly straight line. Moreover, the distribution of the ratios of the number of measures in the development and recapitulation to the total number of measures in each movement lies tightly packed and virtually on top of the golden ratio.” Steven Holl is quoted in an interview with *Progressive Architecture* (PA November 1992, page 57) that he was “particularly influenced, as the design for this [Stretto House] house developed, by listening to the *Music for Strings, Percussion, and Celeste*, by Bela Bartok, who used golden-section relationships in his compositions.” This assertion appears in other sources as well, but seems most appropriate in an article about architecture.

<sup>14</sup>Anne Santoro was a student of mine in the summer of 2000. She is a classically trained and award winning clarinet player. Her symphony orchestra was asked to play Carnegie Hall prior to her coming to the University of Virginia. Because of her tremendous musicianship and scholarship (Anne is an Echols Scholar, majoring in both religions studies and architecture) we have been able to share ideas about the integration of music and architecture. It was this integration in fact that has encouraged Anne to transfer to the school to architecture upon completion of her religious studies degree.

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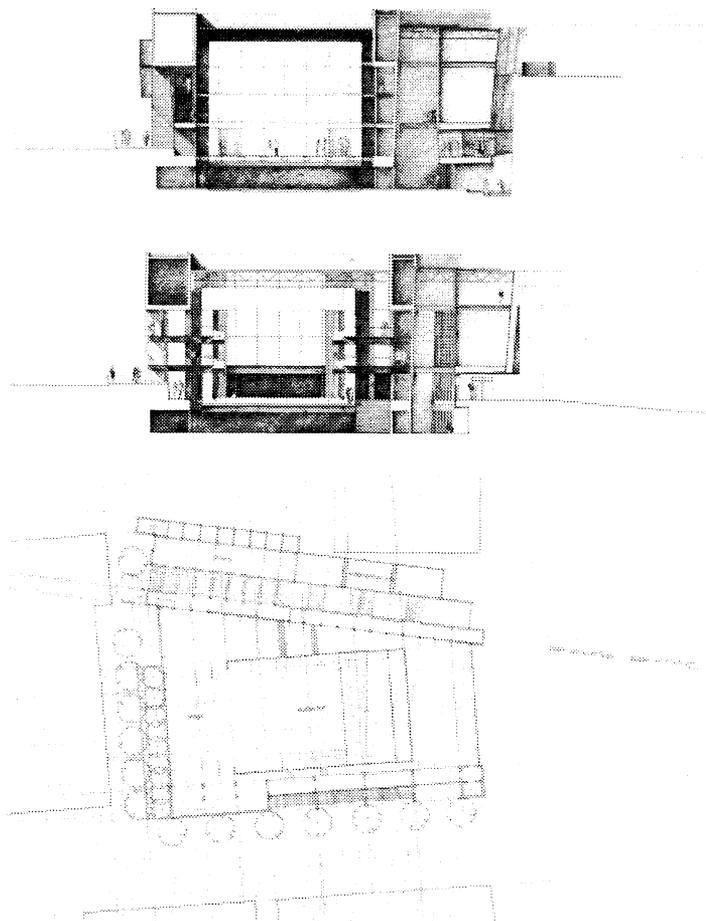


fig. 10: Kid on the Mountain. Petersburg Performing Arts Center based on translation of traditional Double Jig "Kid on the Mountain. Drawings by Andrew Burdick.