Making music out of architecture and from-architecture-music-an oddyssey

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Making Music from Architecture

Chemically speaking or biologically, we research things, but we don't know half of them. We only know our half of it - symbolically - and we don't know ourselves more than half. (Yoko Ono)

Introduction

How to make music from architecture? This is a central aim here. Also, if one can make music from architecture; is it any good? —a loaded value statement, which will be another aim of this research, to explore, analyse and come to an assessment. There are other subsidiary issues, such as: is the relationship, if there is one, between architecture and music, just one way? That is, does the relationship just exist that music can be made from architecture, if it can? Can, in fact, music in any way affect architecture? Can there be a two-way conversation as in *information theory* (Utwente, 2018) involved in a conversation between two people?

From an initial search it seems that it is possible to make music from architecture, in several ways. Some random examples are Guillaume du Fay (Morris, 2018), Charles Jencks (2013), Katrina Burton (2018), Cevanne Horrocks-Hopayian (British Music Collection), Evelyn Glennie (2018), Peter Adjaye (Glennie, 2018) and Matt Lewis (2018). This topic and these exemplars will be explored further in following chapters.

Again, from an initial survey, it seems that there have been attempts to create architecture from a musical base, so that there is already some sort of two-way dialogue in existence (Alimurung, 2012). From *Dithyrambalina's Music Box* of small houses made from reclaimed instruments in New Orleans, through *Court of Water Wall*, where external rainwater downpipes are shaped to create musical sounds in the *Kunsthof Passage*, Dresden, to 'Orb' lights engineered as 'interactive and performative art' hiding under water except when gravitating to soft sounds such as friendly greetings, Coca-Cola's beatbox interactive structure for the 2012 Olympics of architects Asif Khan and Pernilla Ohrstedt, and *CargoGuitar* where 'artists Marcelo Ertorteguy, Takahiro Fukuda and Sara Valente created a playable inside of a guitar from a container (Alimurung, 2012). A businessman in Florida is aiming to spend $1.5 billion to build a hotel shaped like a guitar to attract people to the *Seminole Hard Rock* complex (Stewart, 2017). However 'kitsch' this may sound in an Adorno sense (2001), at least it will be usable with 'private cabanas, butler service, multiple waterfalls, and water sports.' and make it 'an international entertainment destination.'

(Stewart, 2017). This is an extreme end of music affecting architecture, which will not be to everyone's taste. An image is shown below of an artistic preconfiguration. By comparison, an image (**Photograph 1**) is shown of a 50:1 scaled up building of a violin and piano in black and clear glass, in Huainan, China, designed by students of the Hefei University of Technology in collaboration with Huainan Fangkai Decoration Project Co. as an attractive boost to tourism and for musical use with two concert halls and practice rooms (Architecture Magazine, 2016).

My Modern Met

Artist's Preconfiguration Hard Rock Hotel, Florida, client James F. Allen, 2019 expected opening

Architecture Magazine

Photograph 1 *The Piano Building*, Huainan Fangkai Decoration project Co. in collaboration with students of Hefei University of Technology, 2007

In the mode of sheer fun and exuberance, and surely there is room for such in music, three buildings that inspire me in this category are Daniel Libeskind's *Tangent Façade South Seoul Korea*, like a brazen 'punk' statement (**Photograph 2**), John Outram's *Isle of Dogs Pumping Station* (**Photograph 3**), an irreverent humorous comment on Victorian architecture as considered by Piers Gough, but with complex symbolism, mythology and narrative according to Outram himself (Outram, n.d.; Franklin, 2017; Historic England, 2018) and Will Alsop's *extension to the Ontario College of Art and Design* (**Photograph 4**), which to me seems, as with all Will Alsop's work, full of uninhibited joy of living with a sociologically caring heart. Elain Harwood of Historic England said that post-modern architecture is about 'irreverence' from America, 'classicism' from Europe, those two woven together in the UK, and, above all, was about a 'sense of fun.'. Musically, this has many echoes, of wishing to break free from the past, then recapturing history in fragmented ways and experimenting in any way possible. As Piers Gough said in More is More (Historic England, 2018), 'post-modernism is about freedom of expression. It's about bringing an emotional dimension into architecture and it's about pleasure.'.

Kim Yong Kwan, Libeskind Studio

Photograph 2 *Tangent Façade South Seoul Korea, Daniel Libeskind*, 2005

Another related aspect that can have humorous connotations is the world of ecological or environmental sound art. On the whole, this is a serious area designed to bring attention to sustainability issues of global warming, awareness of fragile ecosystems and the interplay between humans and their impact upon the planet. Within this categorisation can fall a further category of sound art. These points will be explored later, however, two examples from initial searches are: first, a sort of pipe organ built into a sea wall at Zadar, Croatia, by architect Nicola Basic (Zijl, 2015), creating sound from sea wave pressure, whilst at the same time imbuing some return of hope to the town having been devastated in World War Two. The second is of a sound artist who literally makes music from the catenary cables, holding up the Brooklyn Bridge, with some computer electronic assistance—this is literally making music from architecture (Richardson, 2015). For me, this is in the same mode that Haydn, Mozart and Beethoven used humour. It is like *joie de vivre* shot through their music, in between the major minor shifts, adding vivacity.

Reid& Peck, RIBA

Photograph 3 *Isle of Dogs Pumping Station*, John Outram, 1988

Richard Johnson, Interior Images

Photograph 4 *extension to the Ontario College of Art and Design*, Will Alsop, 2004

To be clear, the overt intention and main aim, here, is to make some music from architecture, to examine the linkages, if there are any, between the two and

produce five pieces of music, which can then be assessed for any merit or validity. At this stage, the number five is merely a guess, but it represents a number, statistically, that is better than just one or two pieces and is, according to Calter (2008), as the Pythagorean 'pentad', 'incorruptible. Three represents the common minimum of 'a few', four is just one more and five yields a balanced number, such that if all five, by however means they are assessed, produce positive results, then there may be attributed some significance to this outcome. It is possible that the number of compositions could extend to be in the region of ten to twenty depending upon how the creative impulses emerge. Obviously the greater the number, the more significant could be any statistical analysis, but as Katrina Burton says (2018), emulating the modernist architect Mies van der Rohe, "less is more" and this may be a suitable adage here.

The assessment at this stage is envisaged to be some sort of questioning of people, by discussion, interview and questionnaires, a spread of listeners, musicians, performers and composers, and some sort of weighing up of philosophical aesthetic issues. How to weigh up this information will be determined when the nature of the responses and appropriate feel for how to handle the data are obtained. The choice seems to be between a discursive method as explained by Katrina Burton in her Chicago Open House project conference delivery (2018), or a rigorous mathematical analysis. Katrina Burton's research seems to advocate a soft approach, where respondents, who not necessarily having any in-depth knowledge of classical contemporary music, patently connect with modernistic cello music depicting Mies van der Rohe's Carr Chapel in Chicago (2018) (see **Photograph 5**), simply talking about their feelings and backing up their points with gestures. Perhaps this points the way to soliciting opinions on the end musical results by open qualitative discussion, with perhaps observing any associated body language. A more strict scientific approach might be too heavy handed negating sensitive feelings for the outcome. There may be room for both approaches where some responses could be solicited by automated surveys and hand given questionnaires. The correct course here will undoubtedly emerge over time.

Cezara Mişca

Photograph 5 Carr Chapel, Chicago, Mies van der Rohe, Open House 2015

The examination of the commonalities and departures of music and architecture is envisaged to start with a straightforward mapping of language, or terminology, not necessarily of linguistic semantics—this will follow later, during an exploration of the means of communication, or translation, involving semiology, or semiotics (Daylight, 2018). This initial examination will also include a comparison of styles and periods, such as the Baroque, Classical, Romantic, Modern and Post-Modern. Then, supplementing the aim of some sort of statistical spread in the number five, as chosen so far, the aim will be to select from five different epochs or periods of both architecture and music. If more than five compositions emerge it may be that the number of style periods is limited to five. This should be sufficient to show variety of genres, where any more may become confusing. This should provide a sampling strength for assessing any validity of linkage between architecture and music, whilst at the same time simply offering an interesting means of composition.

This is an exciting prospect, which will most likely involve an in-depth exploration of different methodologies of composition, from early mediaeval church to modern electronic music and other styles and methodologies in between, such as sampling data from buildings, or using some sort of semiotic translational process to obtain a written score of some sort, a traditionally notated or graphic score, or by some other experimental means of obtaining music. The aim at this stage is to keep one's mind open and to reduce prejudices to a minimum, in line with the sentiment of Yoko Ono expressed in the heading, where, certainly at this stage, so much is

unknown. That way the musical outcome may be surprising. Whether it has any meaning will be determined along the way and in the final summing up. Not to sound too grand, where research like this should have some sort of purpose (Dunleavy, 2003), it is hoped that in some way this might help the human race, the world in some way. Possibly, this could be via the significance of music in a metaphysical sense, generally, or, by individual meaning or enjoyment through hearing the music, whatever that means (this will be examined later), or by specific assistance or embellishment of the architectural design process.

With experience of construction management, engineering and architecture, both in a working way of life and as an academic lecturer, it is known that there are many fine nuanced studies of management styles and principles, theories of organisations and intricacies of design, in particular how the minds of designers work, the creative process—which may be similar to how composers' creative minds work. This latter point has been studied and in my opinion, as a composer, the issue is generally dodged and described in a musicological sense (Huron in Impett, 2008) and yet with little true insight into the actual mental compositional process. This could be the subject of extensive research. With the central stated aim being of composing music as stimulated by buildings or other artefacts of architecture, this issue along with other ancillary issues will be treated as related yet with a measure of proportionality, adhering to the main thrust of producing music. However, at this stage, it is felt as a hunch there may just be some significant way that music can help the architectural creative design process. It is known that some architects have admitted a positive connection in this sense, such as Daniel Libeskind, who listens to Mozart when he designs buildings (2014), and Raphael Viñoly (Hilferty, 2008), who is an accomplished musician with his own concert hall in his home estate.

A section will be devoted to studying these architects and the history of architects and their connection with music. At least two points of interest will be observed here, the methodology of designing architecturally listening to music, or in some way being affected by music and the actual musical content that possibly transmutes into the design.

A similar study of exponents working (still alive), or who have worked (recently died or from past history) in the field of extra-musical stimulus from architecture will be carried out. This may yield a greater amount of points of interest than from architects. However, this as an assumption may prove to be false, for instance there may be some who fall into both camps, such as in a similar way

Herschel fitted the description of composer and astronomer (Oliveira, 2017). By exponents is meant composers and anyone who fits into a nebulous realm such as a technologist working with computers making music and the quasi world of improviser performers.

To sum up the broad categories of people who will be examined and who may well have cross fertilising points of interest (and in the vein of examining the influence from both vantage points, the two-way viewpoint), they are:

- Architects as influenced by music, past and present
- Musicians, composers influenced by architecture
- Academics or other persons interested in the linkage of architecture and music.

Again in the mode of proportionality, which is by keeping the end goal in mind of producing music, it is intended to make connection with an architect, or possibly more than one, possibly even an architectural practice, to discuss, question and maybe to form some sort of collaborative project, where the effects of music in the design process could be measured in some way.

Having mentioned architectural artefacts, at an early stage it is intended to produce a definition of architecture, so that the parameters of architecture used in producing music can be clearly drawn. There should, also, be a concomitant definition of music, since the boundaries may be blurred, especially where increasingly these days performance can become overlapped into composition.

Finally, with the aesthetic discussion of the translational means of information from the architectural building, or whatever is to be the source of musical stimulation architecturally speaking—on the whole, at this early juncture it is simply envisaged as buildings, or parts of them, that will provide this stimulus—it has for some time been an intellectual challenge to consider in greater detail the sorts of arguments raised by philosophers, such as in topics to do with the graininess of things and their connections, subject: object concerns, along with language, or linguistics. This is the terrain of Plato, Aristotle, Wittgenstein, Pierce, Barthes, Foucault, Deleuze, Derrida and many others. This will be reserved for discussing in a particular chapter later. In this connection, I have my own theory that I call Total Field Theory (TFT), which, I believe will help justify using direct inspiration from buildings, almost in a classical sense of looking at a building and responding with inspiration expressed directly in

musical form mentally and spiritually, which is then transcribed onto paper as music. This will be elaborated in a dedicated chapter. As a rider to this point of direct inspiration, the phenomenon of synaesthesia as noted by some composers such as Roxanna Panufnik may have a bearing (Nepil, 2018). This will warrant a short examination in this connection to see if there is any relevance here.

Before moving on, there is one further way of looking at the paradigm of translation and that is again to look at the model as used by Katrina Burton (2018). This could be described as a meso method, in between a macro or micro analysis—at 'human' level, as the Roman architect Vitruvius (Suppes, 1991) may have said. Burton's style is to examine Mies van der Rohe's statements about his work in the context of Daniel Libeskind, Philip Johnson, architects Stephen Holl and Peter Smithson and Blesser and Salter, commentators on material properties in the context of auditory awareness, in a direct manner talking about the materials used and their properties almost in a way that architects would happily talk about their own work with feelings for the visual aesthetic (although she exemplifies Holl's exhortation to use a wider perceptual spectrum than just the visual in representing material texture through timbre and modulation of vibrato, volume and other techniques), the way light works, the beauty of grains and cracks. She did admit to a hearing impediment which meant that she could not fully enter a specialised sound world which encouraged her to concentrate on the visual aspects of art, especially of architecture. Her delivery is compelling and her composition seems to get into the crevices of the material she depicts. Whilst she comes at this possibly from necessity it does lead one to wonder whether such a lucid approach may have some merit over an elaborate and exhaustive detailed exposition, although she does say that she uses other compositional techniques in other contexts. This will be borne in mind as a salutary reminder as to not overcomplicate analyses throughout this project.

Taking, then, my own theory, along with the other methods, which are not rejected and considered perfectly valid, merely extended upon to some extent in my theory, a brief summarisation of the means of translating from architecture to music that will be considered are:

- Data represented in electronic medium or some other form
- Use of mathematics
- Use of algorithms

- Use of language, linguistics, both in the form of the commonality or disjuncts in the two languages or terminology
- Semiology, semiotics
- TFT – direct inspiration (and relating to many topics of this research)
- Any other methodology that seems appropriate as discovered during the process of research and or reacting to buildings in the process of translating or reacting directly during composition

There is one further area that needs to be examined, yet this, as with other ancillary topics, needs to be kept strictly within limits, so as to avoid detracting from the overall aim of making actual music from existing architectural objects. This area, which could become quite extensive, is all that relates to the actual design and physicality of architectural objects and spaces, the pragmatic influence of architecture upon composing and the realisation of music. There are huge topic areas involved, to do with time, space, acoustics, design of auditoria and other performance venues, architectural design factors and constraints, not least of which is cost—the list is enormous. This will be lumped together in order to handle it as one pragmatic influence of architecture upon music and in order to manage the size of this offshoot line of research. However, it cannot be seen completely as an offshoot since the working stuff of architecture is all about designing and building the physical environment, an essential trademark of modern civilised societies. With reference to the definition of architecture, if one imagines an absence of all the things described, life as we know it could hardly function at all.

There are so many ways in which architecture influences music creation, the house or studio in which the composer works, practice or rehearsal rooms, layout, topography, facilities, services, heating, humidity control, ventilation, lighting, mood creation, the artistic influence of design, material choice and so on. There are also the philosophical aspects of the notions of space and time which are very much the concerns of both camps of architecture and music. This may well warrant its own sub-section within this overall pragmatic look at architecture's influence over music. My theory TFT will also apply here. It is generally accepted as an axiom that location is unique and in real estate terms has unique pricing properties. The environment both natural and built have a unique influence on how people (and I would add incidentally animals and other creatures) think and operate. In philosophical terms there is almost a heightened Heideggerian notion of the uniqueness of space and location (Horrigan-

Kelly et al, 2016). A final comment here is that as throughout there is the two-way aspect in that music can influence architecture in its design mode, for instance by the simple pragmatic of the design brief. Musicians can be clients and request via design parameters their requirements which then the architects try their best to satisfy. There are a number of relevant points here which will be discussed during the examination of this topic area, such as constraints of planning and building regulations, health and safety. There are many factors and constraints, as defined in architectural terms (with reference to the language and terminology chapter) and other parameters, such as the quality of the architects, their design preferences and so on. All these points can have a bearing in some way upon the musical outcome of composition and performance.

Methodology

Current initial researches will be extended upon, utilising the usual search methods of libraries, both real and on-line, search engines, such as Google Scholar and many other sources that are recommended by universities and research bodies.
It is intended to connect with architects and others specialising in the field of architecture as related to music, to discuss, question with open and closed questions and ask to fill in questionnaires aimed at producing data related directly with this research which may prove to some degree to be substantive, either qualitatively and or quantitatively, in validating any findings. Such results can be commented upon as the chapters unfold, also at the end in the weighing up as to whether the aims and objectives of this research have been expressly met. Also, to follow up any research lines of enquiry that may be suggested by these other practitioners in the field.

Having recently visited Norwich cathedral (**Photograph 6**) and felt inspiration there, also some buildings in London (including as **Photographs 10**-**13**) and the small churches of the marshes of Kent and East Sussex (**Photographs 7**, **8** and **9)**, I would like to further study these building and others to make decisions about which buildings to represent in musical compositions. For some time I have felt drawn to Chartres cathedral and would very much like to visit with a view to composing some music in connection with that space—so many areas of interest may come together here, such as the mediaeval wonders of architecture as described by John Ruskin in the *Seven Lamps of Architecture* (1907), from whence sprang so much modern architecture to do with structures, load bearing abilities, masonry, massing, buttresses, vaulting, ribbing, window size, glass, stained glass techniques and art—so many

issues, including of course religious faith, the music of the times, the organ, the layout of choir and congregation, the symbology in the design, what the feeling is of being in such a place—and the question of whether music can affect a space, even the very atomic structure of materials. I will try to interview a person with known views on this topic, Terry Smith, from the Artistic Foundation in Folkestone (Yseult and Abib, 2017). I believe my TFT endorses this, coupled with super string theory in physics, where strings can vibrate musically (Smolin, 2003). This latter point is also endorsed by my own previous research on plant life's response to music (Gover, 2017).

A point worth noting at this stage is that, so far, the spaces that recently impress me to make some music in connection with them are churches and cathedrals. This will need pursuing and analysing to see whether there is anything substantive, whether having, as it were, 'crossed over' from the world of construction and architecture to music, sensibilities have changed, then to what degree this may be subjective—and if that matters.

Photograph 6 Norwich cathedral West window, Grant Gover 2018

There is an excellent website (Norfolk Stained Glass) that produces detailed information and can yield high definition images, with express permission having been obtained—it is intended to do this and use these images as sources for a composition. When visiting this cathedral upon looking at this window I heard organ music which I could have notated there and then on the spot. It was not the occasion since it was a holiday with other matters to attend to. However, I considered that I could revisit at a later date and notate directly there. This would be an example of direct inspiration in line with my TFT theory. Additionally, I heard two voices in my head starting a chant, when visiting the cloisters. This I thought could be another composition. I considered that I might have to undertake a thorough study of early church music in order to imbue myself with the customs and manners of the period, although upon reflection, it might be an exciting idea to use whatever knowledge I

already have, perhaps with some further research upon this topic area, and compose in a modern idiom yet reflecting bygone styles. A possibility of a model in this respect could be Hildegard of Bingen (Hopkin, 2018; Boyce-Tillman, 2012) . This has to be decided.

Photograph 7 St. Eanswith, Brenzett, Grant Gover 2018

It appears that not only are churches cathedrals emerging as themes for composition material, but that a prime area of interest is narrowing down to stained

glass windows. The tracery and window reveals provide patterns as potential sources of music making, as Milton Mermikides discussed with Evelyn Glennie in BBC Radio 4's 'The Rhythm of Life, The World as an Orchestra' (2018) in connection with rhythm and patterns of the universe, plants and as mentioned later, the artworks of Bridget Riley. The images provide a great source of ideas within a long tradition of art and music making. As a Christian I do not need to worry about the semiotics involved. The story goes straight to the heart. Then the music can come straight from the heart. This is in line with my TFT which justifies such a direct approach within a grand ontology of the universe. There is much that can be said about the light, from a physics, cosmological or mystical point of view. Again this falls within the ambit of the TFT. From experience of the Canterbury cathedral stained glass works, an informative exhibition at Ely cathedral and having been involved for a year as an estimator/ surveyor with the conservation of some churches in Kent, I gained an inside view of the craftsmanship connected with windows, the *ferramenta* (metalwork), stonework, masonry and other associated work. This has deepened my aesthetic appreciation of church architecture. I am hoping to express this in music, as Katrina Burton has done and possibly as Cevanne Horrocks-Hopayian (British Music Foundation) (See later).

Photograph 8 St. Dunstan, Snargate, Grant Gover 2018

In order to provide variety, not just stained glass windows, this crown post allies with an interest in conservation timberwork, as exemplified by the authoritative book on dating buildings by their joints, *English Historic Carpentry*, by Cecil. A. Hewett. Perhaps music could be made out of the very material, timber, again, as Katrina Burton did with Travertine marble and brickwork, for example, together with

the historical associations, including, say, that of the inimitable flavour of John Betjeman (1966), Nikolaus Pevsner (Walden, 2011) and the love of the vernacular in buildings of Ronald Brunskill (2004).

Photograph 9 St. Augustine, Snave, Grant Gover 2018

The patterns of the quarry tiles in the main and side aisles, with similar matching kneelers at the altar rail and more intricately patterned tiles of the sanctuary with that peculiarly English parochial light reflecting off the tiles and the altar rails make for ingredients of a musical composition with a mathematical or rhythmic structure. There are also some plain tiles. Altogether suggesting a polyphony of texture, possibly even multiple tempos, or polytemporality. This could make for an interesting experiment.

Instead of taking a linear approach to this research I intend to, as it were, dot about the chapters, out of sequence (which seems to be an advanced method as recommended by Dunleavy, 2003), gradually bringing them together finally in a coherent whole. Additionally, using Christopher Williams (2011) somewhat of a model where he employs a mixture of anarchy and order together with his own personal idiosyncratic voice. For instance, he starts with chapter zero and ends with omega in *Tactile Paths: On and Through Notation for Improvisers* (2011) and yet when he gave a talk at Canterbury Christchurch University (2018) he demonstrated a thorough approach in listening to as many recordings of Cornelius Cardew's *Treatise* that he could obtain, possibly uniquely so, and arriving at a comprehensive taxonomy where his categorisations showed that despite the complete freedom of interpretation related to the graphic score there were in fact genotype similarities. He then showed his commitment in realising the culmination of his research in performing the complete work himself with a handful of other performers to which we listened whilst watching the score go by on a screen (Williams, 2015). This made an impression of honesty, empathy of players, very fine interpretation and attention to the minutest of details, underscored by deep research. His/ their interpretation was both different to the others and yet with some of these patent genotype similarities. A fascinating model of this mix of thoroughness and free thinking.

In this way I intend to start the actual musical exploration of buildings imminently, taking day trips and staying with friends in London, walking around looking at buildings, keeping logs of thoughts, photographs and videos of buildings for consideration of inclusion in the portfolio to be submitted as raw data for the substantive primary element of this research. These records can be kept in an appendix at the end. Already this year, when visiting London for the Shape of Light exhibition at the Tate Modern (2018), whilst taking a short break outside I took these photographs (**Photographs 10**, **11**, **12** and **13**), which show, as it were, humble

modern buildings, that is, not headliner buildings, like Norman Foster's 'The Gherkin' in the City, a CAD (Computer Aided Design) designed and sustainable status symbol, or Richard Rogers' Lloyds of London building, being a prototype of 'inside out' architecture. Two paintings in the exhibition itself caught my eye as to having musically expressive potential. They are both by Bridget Riley, who is mentioned in Evelyn Glennie's Radio 4 programme, titled 'The Rhythm of Life, The World as an Orchestra', in conversation with Milton Mermikides (2018), a composer using various techniques, such as data translated into computer algorithms, where parameters of time, pitch and other musical parameters are allocated to categories of the data. Glennie and Mermikides agree that much of music is about rhythm. They find the work of Riley very expressive of this and kinetically so, always moving. Mermikides extends this to the whole universe.

The two paintings are (**Images 1** and **2)**:
(photographs taken at the exhibition where photography was permitted)

Riley explains that her images are taken from nature, are inimically concerned with rhythm and movement and are 'not landscape, but the dynamism of visual forces—an event rather than an appearance.' (Artsy, 2018).

These two paintings should make ideal subjects for rendering into music, perhaps by using a technique similar to that as described used by Milton Mermikides, by defining parameters, ascribing data points to the patterns and then transcribing to a computer program of some sort, assigning instruments and then seeing what transpires. Whilst there is some decision-making during this process of aligning parameters with raw data extracted from the image and invariably some sort of arbitration on points arising during the process, this is to a large extent a method involving indeterminacy. It will be interesting to observe myself during this process to see how much of the music making comes from me and how much from the process and by inference how much from Bridget Riley.

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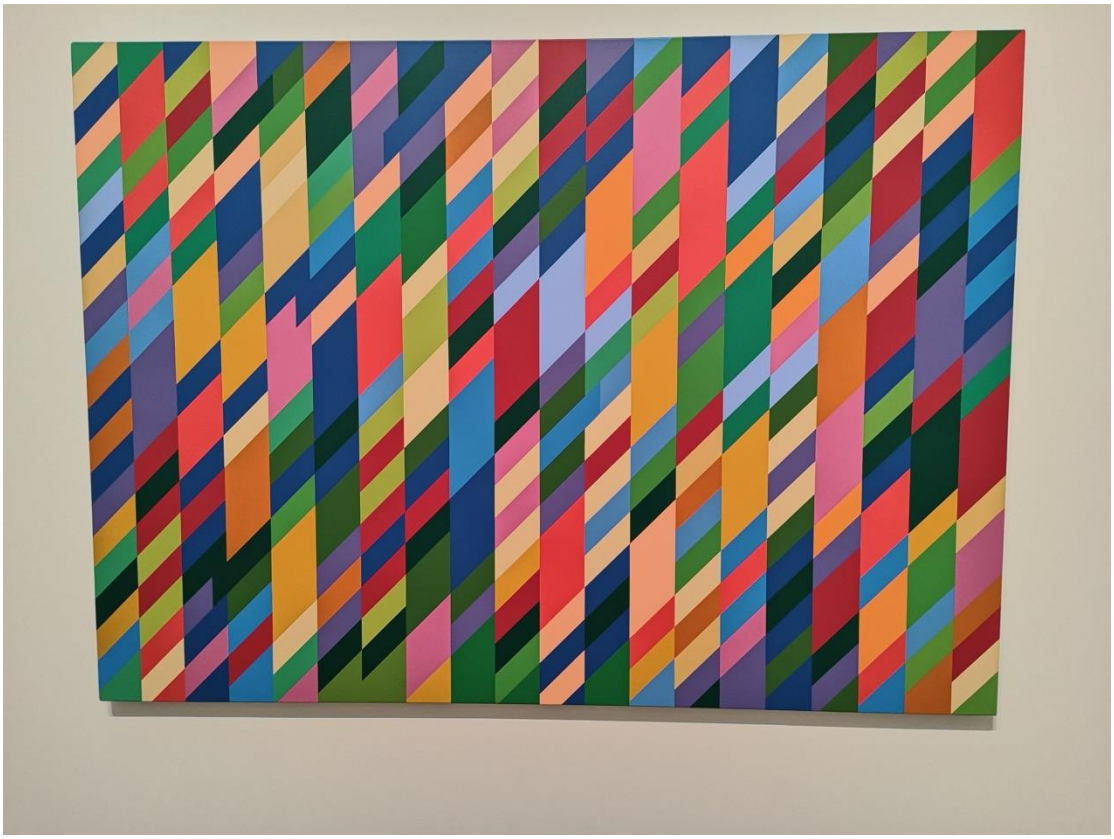


Image 1 Bridget Riley, *Nataraja*, 1993, Tate Modern

Image 2 Bridget Riley, *Blue and Pink [Krefeld Print]*, 2001, Tate Modern

Can paintings be taken as architecture? In the sections defining architecture and styles, it can be seen that not only is architecture concerned with all that goes to make the built environment, but that rather, as the TFT widens to incorporate, nominally, vicarious entities, architecture incorporates a whole host of ancillary subjects, which are partly conceptual, partly real, such as principles of design and management, sociology, politics, history and the evolution of ideas. Its first impact is via the visual sense, an obvious concern of aesthetics, which is famously a predominant interest of architecture. For Bugni and Smith (Beaman, 2002), too much so. They would rather a more sociological premise for architecture, than just for pretty buildings, as often shown in presentational photography without people, explicitly pointed out by Smith (Beaman, 2002). It can be openly seen that where people are incorporated in CAD models the tendency is to arrange them beautifully to amplify the architecture. There may be a functional gesture to show the sorts of people who would inhabit or use the buildings, even walk around the outside of buildings, yet they frequently seem as lifted from another setting or library. They are not real. The emphasis is upon glorifying the status of architects and idealising the buildings, reifying them as exemplars of the latest style or fashion.

The sociological import of buildings will be explored further later on. As a student of building and architecture and then of teaching, I gained the impression that, in round terms, we take in 75% of information visually. Studies such as by Goodale and Milner (2006) suggest that this is not so straightforward, splitting into two systems, ventral and dorsal, concerned with perception and 'visuomotor processing', such as seeing and gripping objects. With initial experience of working with students of 'special needs', who sometimes have difficulties interacting with the world (yet frequently with compensating abilities such as being able to count up to a trillion), and from teaching technical drawing where it is known that people with low IQs cannot put together lines on two dimensional paper to understand what they represent as buildings and parts of buildings, it is clear that to understand and operate in the modern world of increasing complexity of building conurbations and modernistic designs with complex shapes, is a privilege and that there is a need for architectural design to take on board the interests of those, nominally ('nominally' because, as hinted at above, there can be a sort of Gaia system as of James Lovelock and William

Goldsmith (New World Encyclopedia, 2008) where all are equally privileged) less privileged .

Having visited the special needs Care Centre at Shorncliffe, Folkestone and seen, for instance, one child seemingly in constant pain with great difficulty of recognising anything lying and moving about on a special sensory mat in a sensory room with blue light was a salutary experience of what modern technology and specialised architecture can do. It is further salutary that the building has been demolished and replaced by a residential development estate. This feeds into a politico-socio debate to do with how we organise and prioritise societal needs where often the capitalistic profit motive dominates. This could be researched further, but will be reserved as a suggestion for at a later date. It is sufficient here to note that the architecture of modern cities can be a bewildering experience for some and that the debate about how to organise modern civilised societies as manifested in their buildings is very pertinent. The best advocate in this respect seems to be in adoption of sustainability as per the United Nations Department of Public Information (1997) in its fullest sense, including designing with human scale in mind, differing skylines, spaces between buildings, green spaces, interesting and stimulating environments with a full range of facilities of shops, doctors' surgeries, schools, churches, mosques, entertainment, mixed communities, encouragement of local employment, use of 'green' eco-friendly technologies and well-planned transport systems.

Patrick Schumacher the head of Zaha Hadid Architects does not agree (Frearson, 2016). His is an extreme, totally opposite, view of urbanism, continuing the parametricism (use of computer technology to obtain the unusual and structurally challenging shapes) of Zaha Hadid after her death in 2016, yet maybe without her restraining 'heart' (theirs was a 'love/ hate' relationship—my words, including 'heart', although one commentator on the will contestation to be briefly discussed below mentioned that it had been the other way around and that it was well known that Zaha Hadid had bullied Patrick Schumacher (Goldberg, 2018)—another commentator likened the rift as to fallout affecting children after a divorce—perhaps it is messy like a divorce can sometimes be, perhaps like Brexit, as likened to a divorce), centring on cities for the elite and doing away with green parks. His statements are highly controversial and do not form mainstream views (Renn, 2018), yet to be fair he has some pertinent points to make about over-bureaucratisation of planning laws (Renn, 2018). He possibly feels misunderstood since he has written much, seemingly in a Germanic tradition, on aesthetics, *poiesis*, social

instrumentation, philosophy, Marxism and a call for a new Bauhaus, available on his website: http://patrikschumacher.com. He seems to be in favour of a trickle down economy and open-marketism. His dream is for a modern utopia. This is his solution to help those less fortunate at the bottom of the pile of society. This has been experimented with before and to a certain extent is still in use. Modern day politics seems generally to be a *pot pourri* of many shades of opinion. He is seeking to challenge and stimulate the debate to get out of inertia and come up with a truly modern-day solution that is fit for the future world. In this he is not so different from advocates of sustainability, perhaps paradoxically. Since Zaha Hadid died he is overseeing what looks like a very promising project, a concert hall for the Ural Philharmonic Orchestra (Ravenscroft, 2018). This will be left for examination in a discrete section covering the issue of concert halls. This will be seen as a feather in Schumacher's and ZHA's cap. However, recently, he is contesting Zaha Hadid's will against three other parties nominated by Zaha Hadid (Goldberg, 2018). Why would he do this? He must have his reasons which may not be ordinarily apparent. It would seem that Patrick Schumacher is a complicated person, perhaps one of those eccentrics whom one should not write off. As head of one of the world-leading architects, and in a democracy, his views, though appearing at variance with humanistic trends, perhaps we should listen to him—but it is difficult, at times at least! His vision is of a uniform parametric architectural world governed by his Parametric version 2.0 where even more human actions are computer calculated to assist with design (Lubel, 2016)—this is his version of sociology. John Southern claims this system misses out 'history, culture, context, scale, or socio-economic strata—all things that are central to urban life,' (Lubel, 2016). One feels that Patrick Schumacher, at least according to the writings on his website, would disagree with this assessment. The debate will continue. He has certainly stirred up a hornets nest.

Having digressed somewhat to discuss the lifeforce that is Patrick Schumacher and his views on architecture and urbanism—nonetheless relevant if one is to encompass the wide views of architecture on an emerging topic of interest here: sociology—we continue. As part of this vibrant picture of the modern cityscape images from advertising such as celebrated in Andy Warhol's Pop Art of *Campbell's Soup Cans*, 1962 (MoMA, 2018), graffiti and other information sources bombard individuals where mental processing is required at an increasingly faster rate. Barthes and others have commented upon the semiology of this information (Barthes, 1967). Barthes' paper *Semiology and Urbanism* (1967) can be used as a template for

mediation between architecture and music creation, since he succinctly outlines the semiology of a city micro~ and macro~ cosmically, bringing together Victor Hugo, Lévi-Strauss, Jacques Derrida, Kevin Lynch, Michel Foucault, Chomsky, Katz, Fodor, Freud and other philosophers such as Nietzsche and Bentham—and, he neatly provides a semiotic recipe for translating the discrete 'signifieds' and or 'signifiers', depending upon where one intervenes in the constantly changing chain of elements, into music, by using Hugo's textual analogy of a non-classical 'poem which deploys the signifier, and it is this deployment which the semiology of the city must ultimately grasp and to make sing.'. The means are: 'likely' 'procedures' for 'discovering an urban semiology' 'would consist in dissociating the urban text into units, then distributing these units into formal classes, and, thirdly, in finding the rules of combination and of transformation for these units and for these models.' Ruing to an extent the demise of 'symbols', the 'models' he refers to are those where psychologists, sociologists, geographers (which would include cartographers) as mappers of spaces and demography experts have provided data, which is then translated to 'metaphors', then to the 'description' of the signified. The models are 'structural or at the very least a prestructuralist concept.'. In the process Barthes also justifies, to an extent, the TFT, although he seems to have reticent feelings about 'models' *per se* (which is also a concern of mine of TFT yet which in the totality of information is partly vindicated—see separate discussion of this theory) in quoting 'Queneau's *100,000 Million Poems*, where we can find a different poem by changing a single verse;' In the TFT a merest change of the siting of a note provides a new set of permutations and combinations. This methodology offers one of the ways sought to translate from a building's architecture into music. It also brings in some wider connotations of a typical city, which Barthes describes as 'erotic' in a general sense, and possibly sensually too, as Dunsby noted in his analysis of 'grain' in Panzéra's voice (2009), sort of sweeping up the flavour and spice of a city, different areas, the centre, as invariably an open and 'empty' space, or centres (which, interestingly, agrees with architect Andrew Clague's view, as per the interview 12th November 2018—there is also a musical connotation here which will be explored later) where young people gather, slum areas, 'neighborhood's and other 'functions', which Barthes lists as some thirty in number but which can undoubtedly change in number and description over time.

To complete the justification of including art in architecture, from my own perspective, the argument goes like this: from my own experience architecture is

brought to life, firstly, when carpets are laid in a new building, then when curtains are hung and furnishings are brought in and arranged by an interior designer or according to an occupier's tastes. Then, especially when the building is a civic monument, a statue, or statues, or some installation work of art is commissioned. For me, especially when the building is of a poor design, such as the Saga building in the middle of Folkestone. It is patently grim, not even brutalist, of dull red brick with black windows, not with the style of Terry Farrell's MI6 building on the Thames (Jenkins, 2014). Living in Folkestone, I have often thought that this building needs a sculpture competition to create something like large dolphins affixed to the outside walls, as it were swimming around the outside. It would create movement, distract from the brickwork and in fact embellish the building. It could transform it. People would talk about the dolphins. It would be an attraction. It would make people's lives better. They would be more cheerful. Such is the impact that architecture can have upon people's lives. This, also, demonstrates how art, here sculpture, can be integrated with architecture. There is a symbiotic bouncing off one another, building relating to art, art informing architecture. In today's cities there are so many examples of all sorts of art, including pictorial, in cafés, restaurants, offices and public places that eliciting of further examples here is redundant. Coming to the *coup de grace* of the argument, if one takes the National Gallery in Trafalgar Square and the National Portrait Gallery just around the corner in Saint Martin's Place, to isolate the paintings from the buildings would be to not 'read' the objects within the 'syntax' of their surroundings, using Barthes's language. Thus paintings become embroiled with the architecture in which they are situated. It is possible to examine the objects as 'units' or 'discrete' entities, again as per Barthes and the person whom he singles out as the city expert, Kevin Lynch. The paintings chosen as examples from a visit to London, in the Tate gallery, Bridget Riley's, fit this description, whilst offering an appealing use of colour and rhythm. These might well be candidates for pictorial scores for translating to music.

The Architectural images taken outside Tate Modern are:

Photograph 10 Buildings adjacent to Tate Terrace Café, View 1, Grant Gover, 2018

Photograph 11 Buildings adjacent to Tate Terrace Café, View 2, Grant Gover, 2018

Photograph 12 Buildings adjacent to Tate Terrace Café, View 3, Grant Gover, 2018

Photograph 13 Buildings adjacent to Tate Terrace Café, View 4, Grant Gover, 2018

It is noticeable that parameters alter slightly in all four views. With reference to the TFT theory perspective is vital. In fact an inherent concomitant of the theory is that infinite perspectives are needed to fully understand anything. This is the sort of terrain of Bridget Riley and in fact many people: to gain an understanding of the universe which we inhabit. Art is a medium that can help with this project. The evanescent

light from second to second in a scene he was painting was a concern of Claude Monet. This is evident here.

A hastily made score as a late entrant using **Photograph 13** (as **Appendix C**) was submitted to Dorothy Ker, convenor of the Ligeti Quartet Composition Workshop, as part of the CeNMAS (Centre for New Music at Sheffield), 10-12 January 2019. It appears not to have been accepted, which is understandable given the length of time given to the score, a couple of hours, together with misreading the brief which stated 'up to 6 minutes' duration' where without checking it was taken as 3 minutes. Apart from any other considerations, misreading the brief is never a good idea. There are other contentious points, which will be patent upon looking at the score, to do with the format of the score and the ideas based notions including of an experimental nature of collaboration. Whilst there was an element of 'tongue in cheek' fun about the submission, I intended it seriously and it would have been, for me, both interesting from an *avant garde* perspective, whilst meeting quite a few points that I would like examined in connection with making music from architecture, one aspect being from the 'new materialism' point of view (Birtwistle, 2018). Others being to do with architectural outlines, layers, texture, timbre, repetition, translation of pitch and time, political statement, and in fact a whole host more that may have emerged from an experimental session. Lessons here are to take a bit more time in writing music, try to be more accessible to players, but not to give up hope: it is an experimental exercise that I am engaged in and despite any disparity of agreement about the quality of the score itself, there are still some positives to be taken from this first attempt. If nothing else it, perhaps debatably, shows that, in principle, it is possible to do some sort of translation from architecture to music, with a non-conventional score too. It exists and I believe there was/ is some translation going on. There is another opportunity starting on 2nd January 2019 and lasting for five days in the Jaqueline du Pré Centre in Oxford for CoMA (Contemporary Music for All) under the leadership of Alasdair Nicholson. This will consist of writing for different playing levels of stringed orchestra, contemporary experimental improvisational playing/ composing as a composers group, as well as for a trio consisting of leading players. It is hoped that this might be more fruitful than BFE/RMA CeNMAS. I will try not to be daunted by the experience to date and not close up, but remain open minded, hopeful and positive. It is the trio in which I am particularly interested, hoping to come away with a recording of some experimental music in some way explicating a building or architecture in some way, possibly even as Cevanne Horrocks-Hopayian with her

personalised interpretation of parts of Khadambi's house (British Collection), maybe even of the du Pré building itself, perhaps a modernistic evocation of what seems from an initial photograph on the CoMA website to have a modern glass box-like look (also, inspired by the late great Jacqueline du Pré herself—along with what seems like a great swathe of the British public (Sheldon, 2004)), or, perhaps of one of the more historical building of Oxford, in which case taking on board a fully classical remit. Either way, this could fulfil the objective of obtaining at least one of the five initially set number of compositions.

The photographs of the three leading architects of Zaha Hadid, Coop Himmelb(l)au and Peter Eisenman are now shown to contrast with the buildings outside the Tate Modern and to show the sort of modern or post-modern architecture that excites me and which is a great spur to translate somehow into music. They are examples of post-structuralism and deconstructivism, with reference to the likes of Derrida (Santonocito, 2009), an outstanding proponent of textual analysis, which can equally apply to architecture and contemporary music as he demonstrated in his *Adesso l'architettura* published by Scheiwiller of Milan and edited by Francesco Vitale (Santonocito, 2009). Interestingly, the architects, such as Philp Johnson, according to Santonocito (2009), slightly misunderstood Derrida and, if I have myself interpreted Santonocito's text correctly, Peter Eisenman and Daniel Libeskind kept coming up with 'solutions'. This for me is pleasing because the world of construction has taught me and I have taught budding construction managers that if nothing else one must be decisive even if the decision is wrong: just make it and if necessary correct it afterwards, and a mantra in engineering is that for every problem there is a solution.

So, the elliptic and dialectic world of Derrida and others such as Adorno, stimulates action in the world, even if it slightly misses the point, which Santonocito seemed to think happened (2009). This is akin to creativity, where one cannot remain in a state of stasis. One has to create something, do something. But still, from the world of deconstruction with all of its ambiguities comes wonderful architecture and likewise music. There is a symbiosis between disorder and order leading to an outcome in reality, a fruitful one that is the thing created. For me it will be so interesting to explore this weird world, run with it and see what music ensues.

Extracting points from the above will provide:

Suggested Chapter Headings

A definition of architecture

Architecture is the art and science of making sure that our cities and buildings actually fit with the way we want to live our lives: the process of manifesting our society into the physical world (Bjarke Ingels in *AD* interviews)

Architecture is about improving conditions: environmental, social and sometimes also political (Arjen Oosterman in *Volume*)

Architecture is always related to power and related to large interests, whether financial or political (Bernard Tschumi in *The New York Times*)

Architecture is always dream and function, expression of a utopia and instrument of convenience (Roland Barthes in *Semiology and Urbanism*)

Architecture is a real battleground of the spirit (Ludwig Mies van der Rohe in *ID* merger speech)
(Becky Quintal, 121 Definitions of Architecture, 2016)

Having stated a handful of quotations from leading architects, I will draw upon my own educational and working experience, together with my own observations of architecture over several years. It is intended that this definition will be directly relevant to this study. Starting from a practical viewpoint the discussion of architecture will then develop into an examination of aesthetic and sociological concepts.
Resonances of the quotations will be apparent.

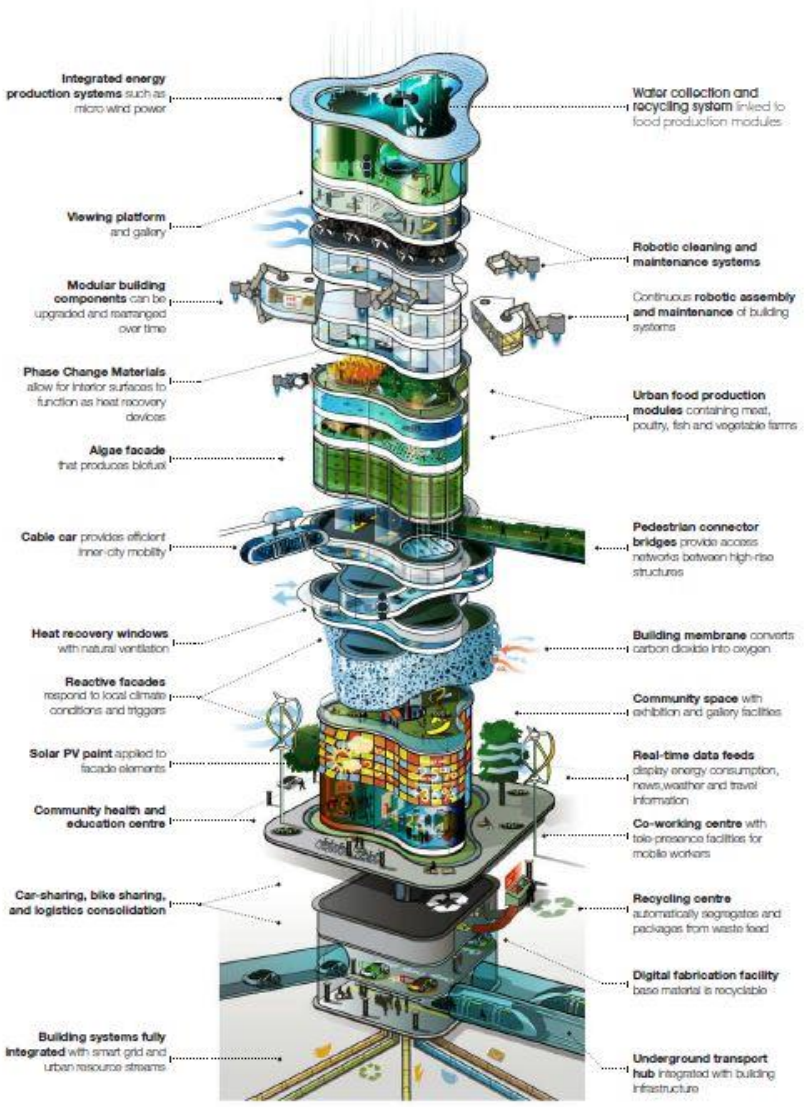
Architecture is subsumed into the generic umbrella term ‘construction’, which covers many disciplines of building construction, management, estimating, surveying, quantity surveying, services engineering, civil engineering, structural

engineering and many other subsets of the general term ‘construction’—and architecture, the design of buildings and all things related to buildings, including town planning, landscape design, interior design, parts of buildings, such as window and furniture design (which Zaha Hadid did and Patrick Schumacher is continuing (Spears, 2016)), things ancillary to buildings, such as plant rooms, bike sheds, even ordinary garden sheds. At BTEC level the definition in recent years has been widened to include ‘the built environment’ (2010), which is an accurate description, for it includes everything that we know and use, from ‘permanent way’ (railway lines), railway stations, forecourts, car parks, waiting rooms, cafeterias, airports, libraries, schools, shopping facilities, all shops, malls, houses, flats, stately homes, offices, doctors surgeries, hospitals, cinemas and other places of entertainment, restaurants, pavements (roads), motorways, flyovers, bridges, tunnels, drainage and other infrastructure, dams, power stations, solar arrays, wind farms, geothermal heat pumps, air heat pumps, green parks, countryside management, communication systems, modern transport systems—the list seems endless. It, in fact, covers everything that we know that is connected to living in the world, whether in the past or now, currently on the face of this planet, or just below within the earth’s mantle. In years to come it will include living on the moon, Mars and beyond. As buildings become more complex and as theories of mankind become more enlightened, the disciplines become increasingly specialised and interdependent, with greater cooperation. Definitions become blurred. The world seems to shrink. Increasingly we think of constructional architectural design problems as global. A materials expert working at NASA on safely sending a person into outer space is still working in the field of construction and design, including cutting edge research at the forefront of scientific achievement. The vison of the future as propounded by the think tank, Foresight, of Ove Arup (Hargrave, Mistry and Wilson, 2013), a respected world leading multi-disciplinary civil engineering company, states that:

> By 2050, the human population will have reached 9 billion; 75% of whom will be living in cities. Until then, climate change, resource scarcities, rising energy costs and a preoccupation with preventing and minimising the effects of the next natural or man-made disaster will undoubtedly shape our vision of the built environment. As major cities reach their boundary limits; extending transit networks and patterns of urban sprawl will no longer provide an effective solution. Instead, demographic and lifestyle changes will serve as major catalysts in the shift towards an increase in dense urban environments.

As city living takes center stage, what will we come to expect from the design and function of urban structures and buildings?

Their view of a typical architectural design incorporating state of the art sustainability and integrated connectedness of communications and transport is:



Hargrave, Joseph, Mistry, Radha and Wilson, Ralph. (2013). Foresight, Arup.

The above may seem far-fetched, but it is simply a logical extension of the trends in construction-architecture and sustainability. Some of the concepts involved are ‘green walls’ made of materials that soak up carbon dioxide, self-repairing elements, which was predicted decades ago by an architect, Johansen, via the Building Centre in Store Street, London. He predicted organic buildings self-assembling from a set of

ingredients thrown into a hole excavated in the ground from an included set of instructions, creating pods with rounded corners, then healing themselves as necessary. There are many innovative concepts like this already in use in construction, self-healing concrete, wallpaper with sensors, adiabatic ceiling tiles—tiles that efficiently help regulate internal environments passively. There are many more, to do with modern materials, such as Kevlar, carbon rods, Graphene—the list is endless. Modern concepts involve Building Information Modelling (BIM), Intelligent and Smart Buildings, robotic construction, printed buildings, use of drones, building a mile high into the sky, use of materials and technology to help solve problems, such as power generation, converting seawater to potable water, hydroponics, emergency rapid construction in places of disaster—again, the list is extensive.

How this is relevant to making music could be problematic. However, it is intended to utilise a spread of methods of making music. At present using five methods is the intention. This almost science fiction world of construction-architecture will present an interesting challenge to write in an appropriate mode. One of these methods could be to use computer generated electronic music which might express this scientific futuristic element. Rather than try to express the whole of an idea or concept, it may be sensible to hone in on a particular aspect that stimulates interest, enter that world and see what develops, almost on a trial and error basis, with perhaps an element of indeterminacy. Another idea could be to take a particular material and explore that as described by Andy Birtwistle (2018) in connection with Petra Lange-Berndt's particularised concept of re-examining material, *per se*, for intrinsic qualities which can inform a sensitive observer in a new way. This can equally apply in a scientific context as well as in a creative one. This may afford one way of composing, by utilising this 'new materialism', as it is called (Birtwistle, 2018), to, as it were, let the material speak musically. This harks back to Katrina Burton, who, in her piece evoking Mies van der Rohe's Carr Chapel, did precisely that, when she let the materials such as Travertine marble and brickwork speak to her in a subtle language using advanced cello techniques, yet in a relatively simple and honest sounding manner, of bouncing the bow on the strings, playing near the bridge and creating the flute-like effect, *flautando*.

It must be remembered that architecture is like Joseph's multi-coloured coat. It is not only concerned with the functional—although Louis Sullivan's adage of 'form follows function' (Craven, 2017) is a difficult principle to break and is probably at the heart of much architecture, especially modern architecture, for instance, of Frank

Lloyd Wright (**Photograph 14**) and in a more contorted way, the deconstructivists, of Zaha Hadid (**Photograph 15)**, Coop Himmelb(l)au (**Photograph 16**) and Peter Eisenman (**Photographs 17a** and **b**) (Design Curial, 2016). This will be explored, to some extent, later. When viewing architecture over the ages it is clear that various aesthetics have gained prominence at various times. These, too, will be examined, in close detail later.

As part of the sustainability remit, stemming from the Rio Earth Summits of 1992, 2002 and 2012, architecture has taken on a caring role of communities, the disprivileged, although there has long been an element of social conscience. Some notable examples of this are the UK experimentalists of the 1960s, albeit sometimes getting it wrong (Heyden, 2014), philanthropists like Carnegie sponsoring education and libraries (the ornate brick built public library in Kingston Upon Thames being one example), Cadbury and Bourneville with their planned cities, the Garden Cities of Ebenezer Howard (Baranyk, 2017), The Peabody foundation with their celebrated BedZED (Peabody, 2018) ecological affordable accommodation, including electric cars, thereby widening the remit of architecture to the mode of transport around the buildings, and sociologists from theorists, Marcel Mauss, Walter Benjamin, Michel Foucault, Pierre Bourdieu and others, to those concerned explicitly with architecture, such as Bugni (Beaman, 2002) and Smith, (2002; Wood, 2017)

To re-capitulate, some main overriding concerns of architecture, are:

- Functional
- Aesthetic
- Political
- Social, concerned with communities
- Problem solving of human and ecological issues, sustainability

Dezeen

Photograph 14 *Falling Water*, Frank Lloyd Wright, 1935

Mohannad Khatib, Flickr, via My Modern Met

Photograph 15 *Sheik Sayed Bridge*, Zaha Hadid**,** 2010

Duccio Malagamba, via design/curial

Photograph 16 UFA-Cinema Center, Dresden, Coop Himmelb(l)au, 1998

Brad Feinknopf

Photograph 17a *Wexner Centre for the Arts*, Ohio, USA, Peter Eisenman, 1988

Brad Feinknopf

Photograph 17b *Wexner Centre for the Arts*, Ohio, USA, Peter Eisenman, 1988

A definition of music

Three sources of definitions are offered: from an online search *Wikiquote* provides some interesting quotations that chime with the tenor of this research. Grove Music Online provides a comprehensive offering of music from the perspective of musicology as a thread weaving through the following text. Finally, I propose a personalised perspective, as relevant to this research.

So, firstly, *Wikiquote* (2017). The first definition in the list, attributed to Debussy, despite the lack of a precise citation, has the ring of Debussy and is an excellent starting off point, since it jumps straight into areas not simplistically musical, that is, the space between notes—this applies specifically to my TFT where the space between notes is of significance.

Music is the space between the notes. It is something to be felt. Although it does not have a concrete and precise definition….All of us know that music is every sound that reaches our ears and our heart says that it is something fabulous…..that is music (Claude Debussy)

The phenomenon of music is given to us with the sole purpose of establishing an order in things, including, and particularly, the co-ordination between man [sic] and time (Igor Stravinsky)

This relates to TFT as regards the connectivity between man the observer, composer, hearer and performer in space and time. Another Stravinsky quotation from a different source is included because of its relevance to music and church architecture.

The Church knew what the psalmist knew: Music praises God. Music is well or better able to praise him than the building of the church and all its decoration; it is the Church's greatest ornament (AZQuotes, Mills, 2012, 1997)

Form is supposed to cover the shape or structure of the work; content its substance, meaning, ideas, or expressive effects (Richard Middleton)

Music is motion in time (Felix Salzer)

This relates directly to TFT (see **Diagram 3**)

Music is organised sound (Edgar Varèse)

Undoubtedly more quotations could have been elicited, but this provides a sampling of the sorts of issues music is concerned, from emotions to form.

The second source is Grove Online under the heading of *Musicology*. Here such people as Robert Balchin, Lydia Goehr, Susan McClary and Gary Tomlinson, amongst other experts in their particular fields, provide a comprehensive account of music: 'from the outside', according to Bojan Bujic, although he is specifically referring to sociology and music. He considers that 'sociomusicology' as studied from within should provide a greater insight than from the external perspective of sociology

per se, although he ends by saying that with developments in the latter part of the twentieth century, including of ethnomusicology, there is 'lack of clear distinction' between the two. Sociology, including sub-themes of race, gender, culture, and politics in music is emerging as a theme for inclusion in my interpretation of architecture, both form the architectural and musical points of view. It is this external view of music by musicology that provides a rounded definition of music (Duckles et al., 2014).

Picking up on this sociological theme, so far, Katrina Burton seems to have an equal empathy for the architecture and materials in Mies van der Rohe's Carr Chapel as for the people who casually listened, yet with rapt attention and with free opportunity to move around (Burton, 2018). Cevanne Horrocks-Hopayian, similarly, displayed a warmth and respect for the owner of Khadambi House, the architecture and the artefacts within the house to make evocative instrumental and sung music representing faithfully her feelings developed over the duration of her two-year residency (British Music Foundation). On the architectural front, Andrew Clague the head of Clague Architects of Canterbury (2018), during a two hour interview and accompanied walk around his practice, displayed great affection and integrity both for the architectural designs and his staff. He even used words like 'love' and 'spirit', singling out one housing scheme pinned to a wall as displaying 'love'.

Returning to musicology, as exemplified by Grove's online entry, there may be some shortcomings of musicology in not fully understanding what goes on in a composer's head (Huron in Impett, 2008), yet when all the stances of critical theory, historical evaluation and analysis are added up, a far greater understanding of music is obtained than when it was just described by composers, musicians, biographers and nineteenth century critics, such as Hanslick (Grimes, 2017).

The Grove Online source demonstrates how music has evolved from the earliest days of musicology, two hundred and fifty years ago (Grimes, 2017), to the modern day encompassing so much more than the German nineteenth century view of *Musikwissenschaft* or the French equivalent of *Musicologie* with the different flavours of other nationalities, such as of Italy, the United States of America, Japan and other countries of the world, enriching the way music can be conceived and opened up by incorporating eastern philosophies, new tonalities, instrument range, even pop, folk music and other idioms. From the early Greek view of music, or Pythagorean number based systems, the compass of music developed as scientific knowledge and world views evolved, such as via the renaissance, the enlightenment, up to the modern day

when everything is considered possible within music: theatre, performance art, sonic and environmental music, electronic music, decomposition of sound spectra and use of partials such as by Grisey (Vdocuments, 2015).

There are certain trends, movements or particular ideas that are relevant to the possibilities of this research. Since the spread of compositions are to range from different styles or periods, the section on *organum* in Grove Online and other such early ways of composing could well apply and warrant deeper exploration, as developed into early Italian and English periods, taking in composers like Claudio Monteverdi, Giovanni Gabrieli, Henry Purcell, William Byrd and Thomas Tallis. This could resonate with the emerging empathy in this research with churches and cathedrals. Likewise, anything pertaining to the late Renaissance or Baroque period, including organ music, such as of Jan Pieterszoon Sweelinck, Girolamo Frescobaldi and Johann Sebastian Bach, where organ music was mentally stimulated by the West window of Norwich cathedral.

Still using Grove Online as a template for musicology, the rules of counterpoint could, then, apply, although living in the twenty-first century it is difficult to be unaware of and influenced by modern loosening of rules, playing around with musical concepts started by the Darmstadt school immediately after World War Two (Iddon, 2013), such as by Hindemith, Webern, Schoenberg, Stockhausen, Nono, Goeyvaerts, Boulez, Berio, Messiaen and many others, including those since, such as Mathias Spahlinger, Helmut Lachenmann, Louis Andriessen and, arbitrarily, as Clemency Burton-Hill's list for the BBC (2014), including Stravinsky, Shostakovich, George Gershwin and Duke Ellington.

Where music comes as stimulated inspiration I would generally try not to constrain with rules, but keeping an open mind, write as fast as possible keeping it as naturally flowing as possible. All the imbued knowledge of theory, history and culture would no doubt show in the final result in one way or another, but in the white hot heat of decision making during this sort of composition it is sort of like a trap door letting out the odd bit of information from within to inform the composition without having time to examine it—and as honestly as possible, thereby sometimes creating something that is not always populist but perhaps interesting to some. So, at this point, one does not have an idea of what will come out—one will just try to get as close to the source of inspiration as possible, as per the TFT, and then let it work its way out.

Having worked on the commemoration of Sir Peter Maxwell Davies in 2018 at Canterbury Christchurch University, learnt about music in the Maxwell building dedicated to him, also at Christchurch and redesigned by my first interviewee, Andrew Clague, and, considering that he is included in Clemency Burton-Hill's list of top twentieth century composers, there must be some model of his that I can use. That is for me: an overall honesty, openness of mind, preparedness to change at a moment's notice, a complete joy of living and celebration of small things, an irrepressible sense of fun, seeing music all around in a haptic way, wishing to share that joy with all, to teach and to carry on evolving through life's grand adventure.

A point of particular interest in Grove Online is included in Vincent Duckles' section on text, on 'urtext'. For me, where the modern tendency is to 'correct' text I find an authenticity in going right back to the original unexpurgated source being akin to taking inspiration from sources in nature such as birds singing or street conversations. Manuscripts can be a mine of signifying information. There is also the matter of truth where translations, even transliterations, of the Bible, foreign textbooks, literature, poetry, frequently miss the point, the spirit of the initial meaning. Occasionally translations can embellish the original. Rather than going into specific instances it is probably a sufficiently widely known phenomenon to leave as a general point here.

Since it was mentioned earlier, it will be noted here that Tilman Seebass (2015) has commented, in his section on iconography, upon synaesthesia, of which Roxanna Panufnik has admitted to experiencing (Nepil, 2018). Essentially, he says that only pockets of research have been carried out to date on Schoenberg, Klee and Cage, but that this is an area ripe for further research, 'much remains for future scholars.'.

I personally often have a programme or narrative in mind when composing, perhaps somewhat like Franz Liszt (Fallon-Ludwig, 2014) and am highly interested in the relationship between colour and music, just to imagine a colour and see what music emerges. Daniel Livitin (Forrest, 2010) discussed Alexander Scriabin on WQXR USA radio station in connection with a light show which may or not be the actual colours that Scriabin saw. Peacock (1985) was more optimistic about research on synaesthesia and examined actual colours to be used in *Tastiera per Luce*. Cuddy, on the other hand, found some substantive connection of colour and higher mental auditory processes by finding that colours mixed as predicted using the circle of fifths (1985).

In a way the imagining of materials in the first piece *An Unknown Building in Four Parts: Part One* (**Appendix C**) is in this mode of thinking, as well as being a foray into asking performers to directly participate in experiencing the 'new materialism' (Birtwistle, 2018). Perhaps a composition based upon the work of Bridget Riley as argued earlier could yield evidence of such a link.

It is highly noticeable that concrete and cement and sand rendering in the UK is frequently grey (which may suit Brutalist architecture; otherwise it can look drab, forbidding and depressing—that is, apart the view of it being relatively unsustainable, a significant contributor to carbon dioxide (5% of man-made world contribution, Berg, 2016), where construction, including its use of cement, a component of concrete, rendering and cement mortar, generally is a significant threat to ecology (Grooten and Almond, WWF report, 2018), or left in its natural colouring perhaps to be painted later, whereas on the continent it is noticeable that concrete and renderings can be colourised to provide pleasing pastel hues. Perhaps there is room for both—perhaps in a composition juxtaposing both grey and colour side by side where each can comment upon the other. It is an idea for later consideration.

When it comes to assessing listeners' reactions to music and specifically the music produced by this research, Eric, F. Clarke (2015) expresses *caveats*, citing Helmholtz and Cook, about interpreting too much from applying *gestalt* or cognitive psychology and fears that psychology and music can become erroneously conflated. Furthurmore, Clarke cites Agmon advising against the dangers of collapsing physical, perceptual and cognitive domains and competence and performance theories. On the positive side he outlines the work of Meyer, Narmour and Laske from 1950s to 1990s with a measure of credence largely emphasising cognition as an important part of listening. Clarke stated that Meyer's and Narmour's work on *information theory* forming a part of this process fell out of prominence as he claims the same happened for *information theory* itself.

I would contend that this is not necessarily the case as is evidenced by the advertising of two conferences in China (ITW, 2018) and the United States (ISIT2018Vail, 2018) and the syllabus of Professor John Daugman of Cambridge university (2018) covering the mathematics and science of information theory including issues that crop up in electronic music making, such as Fast Fourier Transforms, spectral analysis, Gaussian channels, bandwidths, noise reduction, data compression and, interestingly from the specific point of TFT regarding degrees of freedom of notes, 'The quantized degrees-of-freedom in a continuous signal […] in

quantized, countable packets.', together with the recommended course textbook on this topic by Cover and Thomas (1991). Kieffer also reviewed this book (1994) and endorsed it as a worthwhile textbook.

The information theory in these sources is mathematical and scientific emanating from Claude Shannon's ground-breaking work in 1948, *A Mathematical Theory of Communication*. This is slightly different, and yet related to the type of information from Universiteit Twente (Utwente, 2018). They start with Shannon, bringing in Weaver as a co-worker, on the technical project of conveying information, which Hannah Fry in *The Joy of Data* simply shows as the Shannon entropy formula (later coupled with Donald Davies' 'packet switching' to produce the modern information age):

$H = -\sum p\,(x) \log p\,(x)$, where H = Shannon's Entropy, p = probability and $\log p\,(x)$ = The Shannon bit, the smallest piece of information as far as computers and packeted communication is concerned.

As Luciano Floridi states in *The Joy of Data*, the data then transformed into zeros and ones in binary code is devoid of meaning; it simply conveys 'Shannon Information'. The reason that this is shown, is as related to the Total Field Theory (TFT), because, here, in order for it all to work, some information is missed out as inessential, thus transmitting only significant information. In the TFT no information is missed out, and, magically, meaning is obtained by the aggregation of *all* the information. It is noted that the TFT is purely theoretical, so in the real world Shannon theory is needed—not completely theoretical: in fact invoking constant back and forth relationships with the real world, as well as having real effect musically.

And as a final rider to the Shannon formula, it is my contention via the TFT that there are smaller 'bits' of information than the Shannon bit. In physics the smallest bit might be the Plank measurement. Possibly, quantum physics might posit even smaller scale measurements. Theoretically I think this is so, but this would need experimental evidence which would be extremely difficult[i].

The remainder of Twente university's various sections on communications studies are essentially business orientated, concerned with computer technology and how individuals and groups work within organisations. So, they extend upon pure Shannon information technology to slightly wider social concerns. In construction management there is extensive teaching and learning about leadership styles, styles of

management, theories of organisation, sometimes coupled with systems of planning and problem solving. Communication is a big topic that can extend from the informal to contractual matters. Architects drawings are recognised as a form of communication and BIM (Building Information Modelling) is seen as the latest advance to assist in the complex world of contracting.

It was a subsidiary aim to try to somehow bring music into this mix of business communication, but from the first visit to an architects' office, whilst in all other respects the visit was highly productive and where in many ways music plays a part in the day to day activities, even being seen in actual designs (to be explained shortly), it is recognised that in order to fruitfully introduce music into the design and management operations it would need to be introduced with full explanation to all parties involved with perhaps a pilot scheme, monitoring, amending as necessary to suit participant input, full writing up as reports, obtaining feedback and so forth. In plain terms it is unfeasible to implement along with other factors of testing for a relationship of music with architecture.

To discuss the positive results of the visit, there were various ways in which music impinged upon the architectural working lives. There were some twenty five people all working assiduously at their drawing stations, with an assortment of conventional drawing boards, desks, using a mixture of manual drawing, CAD (Computer Aided Design) and Photoshop, and computers, some implementing Revit, an architectural application, and BIM to an extent aimed at BIM Level 2, which is the government's hoped for realistic standard. The government would actually like Level 3 aimed at but whilst the UK is a world leader in implementing BIM there are still many issues around this to do with training costs and time out and the fact that this is unrealistic for the majority of the industry which is composed of SMEs (small to medium enterprises). It seemed that many if not all listened to music whilst they worked, like Daniel Libeskind. Music tastes varied from heavy metal to Radio 6 to Mozart. Where Radio 6 was concerned this was by consensus of all of the people in that room, where also they deferred to one person who in his spare time was a deejay. This could warrant further study regarding group work, motivation, communication and the effect upon design. It was discussed as to whether or not listening to music had any affect upon the designs and to an extent this was agreed as a general effect. One example was the pulse or tempo of the music could literally affect the pace at which one worked. We discussed the musical style affecting the architectural design outcome and music helping with mood swings during the working day but at the

conversational level conclusive outcomes in these respects could not be claimed. A very pleasing result was from one member of staff who discussed at the time and followed up by sending details of a friend of his who designed and built a bridge in the Lake District. The photograph as shown below (**Photograph 18**) will then be discussed as to how this is almost the first direct proof encountered personally in this research of music being actually incorporated into architecture.

Photograph 18 *fisherman's bridge (2008)*, Honey architects.

Why is this so interesting and relevant to this research? It satisfies so many points that have emerged: sustainability, actual music *in* architecture, the appeal of the design aesthetically and from an appreciation of architecture itself, even materiality. The shape of the body of the bridge is actually a bending moments diagram of a simply supported beam, pared down to the minimum, thereby embodying the principle of 'form follows function', which then becomes a self-explicatory thing of beauty.

Apparently the structural calculations themselves are minimalistic, or allow for minimal things that structural calculations usually should allow for, such as an evenly distributed load of 5kN (kiloNewtons) usually per metre squared but here per linear metre, or so it would seem to one commentator and I tend to agree (Happy Pontist, 2011). It is questionable, then, whether this has been strictly designed in accordance with Eurocodes and British Standards and so on, and yet it stand there magnificently. However, to be fair, the *Architect's Journal* (AJ, 2009) does list a

Structural Engineer, Price Myers Geometrics as part of the Professional Team, so calculations will have been made and no doubt with all due consideration of relevant factors. Again, the *Architect's Journal* (AJ, 2009), states rather grandly, sounding like a Zaha Hadid Architects' job, that it was 'parametrically modelled and structurally optimised on the computer, the resultant form was unwrapped to produce steel templates that could be CNC plasma cut, being folded into shape and welded together to create the right monolithic deck.' This could be an example of hyperbole. They do go on to say that 'Fabrication and installation was by local crafts people.' At least that much seems appropriate.

There is an implied political statement here of defying bureaucracy. I saw a video of it where the river level flooded and washed constantly over the bridge (The Happy Pontist, 2011). A criticism was that it was not designed to be high enough (The Happy Pontist, 2011). However, it withstood the flood and in a way this is another triumphant statement against the forces of nature, or as I see it, participating with nature, being *in* nature. The abutments at both ends are almost ridiculously simple, concrete, melding into the rocky terrain. The steps are simple. Health and Safety regulations are possibly not of paramount prominence here (not a habit that I would generally encourage), yet there is no report of anyone having fallen off or injured themselves, another demonstration against the powers that be, a bid for individual freedom of expression, and one that is expressed within the natural terrain of nature, blending in with minimal disruption, even embellishing nature, which is a very hard thing to do. The supports at either end are again minimalistic, providing small area in order to transmit the loads to the ground both sides, yet they withstood the flood—and possibly because of the slenderness of these supports. Fences that have gaps in them are better able to withstand strong winds than solid fences. So, again, maybe what some might describe as inadequate bearings at both ends, might be the solution that flies in the face of conventional wisdom about designing bridges and their supports.

The main material used is steel, but of a sort that is known to rust, deliberately so, and form a protective coating, Corten, and the uprights are only painted (The Happy Pontist, 2011), another sort of anti-establishment statement, yet aesthetically so. The Happy Pontist, a bridge enthusiast found this all to be charming (my interpretive word), likening it to 'a piece of rusty old farm machinery which has been dragged to the bottom of the field and dragged across to span the river.' and goes on to say that 'it's one of the most interesting bridges to be built in the UK in the last few years' and ends whimsically by calling it 'a delightful little haiku in Cor-Ten.'.

Incidentally, he stated that it was shortlisted in 2010 for an RIBA$_{350}$ Award (2011) and that it was ‘a crying shame that the bridge has received so little attention’.

A local blacksmith apparently carried out most of the assembly work (AJ, 2009). This is a sustainable good point, minimising ‘carbon miles’ of driving to and fro, plus providing employment for the locality, together with supporting artisan craftsmanship. The welding on the actual walkway is not the sort that is required on modern jobs where they have to be immaculate, almost hidden, and pass all sorts of tests. These are chunky, in one’s face, and the link bars to which they are attached are possibly a potential tripping hazard, yet anyone with any sense will see them there and simply step over them. They will undoubtedly be also fulfilling some sort of structural function, are open to the elements, yet seem perfectly intact.

The *coup de grace* is the actual uprights, the standards, balustrading , parapet or whatever term is used to describe them. Again, they are minimal, possibly of little or no effect as a handrail, or safety guard against falling into the river. They are haphazard in length (for a reason) and therefore do not comply with frequent calls for tidiness and symmetry. They look chaotic and possibly wave around in the wind. The chaotic look fits into the natural setting well, nature having a lot of chaos, as well as order, within. But, the big point, is that the rods are of different lengths for a reason, and that is because each is tuned to play a tune if hit with a mallet or ‘stick’ (Happy Pontist, 2011). No doubt they resonate in the wind, further melding into nature and no doubt using the actual body as a sound board (The Happy Pontist states that the body is in fact a box girder, is hollow, and does act ‘as a resonant cavity’, 2011)—it functions as an instrument, it *is* an instrument.

This is prime evidence of music actually being incorporated into architecture and this explains why I have rhapsodised about it, in fact agreeing with the Happy Pontist. To me it is as beautiful as a first class piece of music by Johann Sebastian Bach.

Returning to the binding thread of musicology, as per the template source Grove Online (Duckles et al., 2015) and nearing the end of this warp and weft, an important section is on performance. Vincent Duckles and Janet K. Page in essence outline the HIP (Historically Informed Performance) movement involving such people as Gottfried van Sweeten, Mendelssohn, Arnold Dolmetsch, Beyschlag, F. T. Arnold, Robert Haas, covering such issues as the debate over whether to use modern bright instruments or early instruments [frequently of lower register, sometimes harder to play and with different tone and timbre], use of ornamentation, realisation of

figured bass and embellishing scores, the latter practice excoriated by Robert Rawson in his inaugural professorial lecture at Canterbury Christchurch University (2018), where he cited the almost ruination of a Corelli score. John Butt who has also previously lectured at Canterbury Christchurch has outlined the arguments for and against the whole HIP movement in his book *Playing with History* (2007). His argument is that it is difficult to be totally precise about what is correct, it is really a matter of what one feels is correct in the present day in present performances and when I asked him the question about the dilemma of the more history advances the more remote are the periods in question [say the sixteenth and seventeenth century] he said the answer was greater historicism, which makes sense, since the more unearthing is done the more records will come to light to assist with making informed decisions.

Robert Rawson also held the view, paraphrasing, that playing should involve modern day emotion and truth. He is an Eastern European scholar, especially of former Bohemia, anything Czech.

Duckles and Page continue with post war scholarship of Robert Donington, Thurston Dart, Frederick Neumann, Sol Babitz, Michael Collins, Putnam Aldrich, Paul and Eva Badura-Skoda and Howard Mayer Brown, where they pushed the techniques of analysis essentially with the greater historicism advocated by John Butt. Richard Taruskin in the 1980s has touched upon the delicate subject of 'authenticity'. They end by mentioning twentieth century concerns about 'cultural context, the acoustics of performance spaces, aesthetics, relationships between composers, and relationships between modern and old perceptions of performance.'. When dealing with historical performance in modern times, unless one has proof positive about a certain technique or style of playing then 'perception' must surely be a key word, and then there is the argument about whether one should interpret or reinterpret in a modern idiom for modern day audiences.

As a composer my opinion is: both, depending on the day, time and occasion, the composer and the work: adherence to the score—and not adherence, even adding, changing, mutating the score. For my own compositions I am heartily delighted with players who take the score and run with it with their own inflections. I agree with Spahlinger and others who delivered papers at the Goldsmiths conference (Redgate, Exarchos and Zaldua, 2015) that there are infinite possibilities and my own theory, TFT, supports this. I personally would not want music ossified as some venerated museum relic, it must be a lively response to life in the moment. Furthurmore, I

support the work of those advocating real collaboration with players where new positions are negotiated. This is evident in the score *Unknown Building in Four Parts: Part One* (**Appendix C**).

The above set of papers included much to do with modern day concerns of composition, a political aesthetic, and electronic music in many forms. To bring the Duckles and others' review of musicology to a conclusion, having mentioned various theories, including serialism of Krenek, Eimert, Babbitt, Boulez and Perle, they state that, under the headings of 'speculative traditions' tracing back to Hellenic times, of 'sounds, intervals, rhythmic proportions, scale systems and modes' often with a 'cosmological order' (all of which still resonates generally today, and with my music; the cosmological reference resonates with my theory TFT and with some of my musical concerns, and the word 'sounds' covers much from the Music of the Spheres to environmental sound art), 'Cage's aleatory and Xenakis's stochastic music', 'the twentieth century has fractured into a multitude of individual styles and syntaxes' where theorising has by and large given way to 'a particularist kind of descriptive analysis.' Whether this is true about theorising, it seems true that music is so wide embracing as to cover anything, so anything goes.

The languages of architecture and music

The aim of outlining the respective terminologies of, firstly, architecture and then music, is to see where they map across, to trace how the two disciplines are related. Then, especially considering the medium of language, how they can be translated. The prime translation wanted for this research is from architecture to music, but it is also interesting to see if translation can occur the other way around, and, more than interesting, whether there may be any substantive content in the conversation that might in any way contribute qualitatively to architecture. They might be slightly out of phase, but it is the contention to demonstrate via this straightforward mechanism of commonality of language that other efforts of finding ways that the two can intercommunicate can be assisted by the fact of similar lexicographies, albeit partial. The aim, also, is not to be overly linguistic in this study, but rather simply to see how actual words, or *logoi* (Encylopædia Britannica, 2018), can be similar, dissimilar, or close in meaning, thus demonstration linkages.

Architectural terminology

From experience, a starting point could be the word: ‘space’. I remember being taught at the Hammersmith School of Building and Art in Shepherds Bush, London, in the 1970s that ‘space’ was an all important aspect of architecture. It was something that could inspire awe and that it could be ‘spiritual’. There were so many parameters to it that it was hard to get right. One of my personal images of this is of a cat ‘who’ enters a room, stops and scans it taking sonar measurements of everything in the room, or to use a modern method of surveying, photogrammetrically, gaining a 3D picture, so that if an object is moved it knows it. For me, this is multiplied up with many other modes of measurement, or relation, including to do with light, relative massing of objects, aesthetic effects upon the being, the spirit of place, modes of being throughout the day, season, year and longer periods, ergonomics, *Feng Shui*. Amazingly, Andrew Clague (**Appendix A**) brought up in the old tradition of architecture, agreed. This sort of thinking just does not enter the encompassment of many architects today. They are caught up in a regime of regulations, designing by manual and the all-important ‘factor’, or ‘constraint’ (these two words ‘factor’ and ‘constraint’ are similar as for music, yet specifically prescriptive for building and architecture. They will be examined shortly in this respect), cost.

I now illustrate this with a personalised case study of a home, or dwelling place to use the jargon. Taking a typical room as an example, from Building Regulations, starting in 1966, minimum ceiling heights became set at, firstly, 2.1 metres, then 2.0 and then retrenched to 2.1 metres again with the minimum height on stairs of 2.0 metres. Victorian ceiling heights are frequently anywhere between 10 or 13 or more feet, which is about 3 metres or more, then frequently decorated with ornate cornices, made out of Plaster of Paris, sticks and rags (for reinforcement to stop cracking) in the junction between ceiling and wall, possibly further decoration on the adjoining ceiling and an ornate central ceiling rose for the light fitment. Coming down the wall, a frieze at the top of about a foot (300mm or so), a picture rail, possibly some panelling to differentiate wall areas, possibly a dado or chair rail and then ornate skirtings, possibly ‘stepped’, of built-up timber sections cut into elaborate sectional shapes or moulds. Some basic moulds are Torus, Ovolo, Cavetto (or Scotia), Astragal, Fillet, Bolection, Cyma Recta and Cyma Reversa. There are many others, all emanating from classical Greek and Roman times. There are other features and details, but this suffices to illustrate some differences between now and bygone eras. Each embellishment or adornment would be evaluated. The pressure from quantity surveyors, the ‘money people’, would be to reduce the designs down to bare

essentials, unless the client was rich and wanted elaborate interiors. There are many other issues, which for reasons of space must be omitted here. To give an idea of these other issues, they variously include political will to invest in apprenticeships, national economics, conservation and historical expertise, modern day matters of taste and style (According to Patrick Schumacher, ZHA, Zaha Hadid Architects has its own in-house interior design department aimed at the high end of the market: Spears, 2016), a functional approach to heating spaces volumetrically, gross or net usable floor area, standardisation of material components and building systems and planning laws about heights of buildings. These are just a few of these other items. The result being that imaginative housing schemes are on the wane. Clagues, on the other hand, demonstrated a rare approach to housing, which still needed to keep an eye on developers' profits, yet managed to consider thoughtful melding into countryside, some sustainability consideration and even overt musical references to street layouts (**Appendix A**).

Apart from the architectural 'spiritual' versus functional approaches to space and the well-known mantra alluded to earlier of location, location, location, all the issues of topography, orientation, traffic and parking considerations and so on, there are other considerations, such as Einsteinian and other scientific views of space-time.

It soon becomes apparent that each point could warrant extensive coverage. In order to simplify, it is decided to take a tabular view of the two disciplines with short notes on each. It seems already that the case for there being a cogent link between architecture and music as hoped for is emerging. In which case this terminology comparison should only reinforce this position. There seems, then, no point in exhaustively analysing all the linkages. A few sampling points need only be made.

Musical terminology

Musical terminology relates to the whole business of scoring and playing music, essentials being key signature, transpositions, transition, tempo, speed, expression markings, method of playing, pitch or frequency, dynamics of how loud or soft to play and the salient points listed in the table below. Much of this can be equated to architecture, some of which emerges when looking at some cases, such as of Patrick Webb (2018) (a craftsman plasterer and lecturer with a defined sense of architectural history) , even though buildings are generally static, are 'constructive' in a philosophical sense, and phenomenal, again philosophically, as existential lumps of matter which are there existent in front of one's face, whereas music moves linearly,

generally, and ephemerally. Some of the finer points of these statements can be debated, but in the spirit of generally trying to establish overall linkage between music and architecture broad categorisations are considered sufficient.
In view of the foregoing, the listing and comparison of musical points will be limited to the table (**Table 1**), as follows. The link between the two should be easily visible. Points will be kept relatively limited, simply serving to show correlation.

Architecture		Music	
Structure	Concrete, steel or timber frame, beams, trusses, ties, braces, shear walls, joints, types of floor, columns, foundations	Structure	Nineteenth century and before notion, Modern and Post-Modern, vertical and horizontal, poly ~tonal ~rhythmic, free
Form	Box, cellular, tunnel, A frame, parabola, hyperbola	Form	Sonata, rondo ABACABA, binary, tertiary
Shape	Rectilinear, cubic, geodesic, high-rise, curviform, parametric	Shape	Phrasing, melisma, 'architectural arch', freeform
Element	Floor, ceiling, wall, door, window, sanitaryware	Element	Key part of music vertically, horizontally or both
Component	Window, kitchen fitments, preformed pods	Component	Constellations, movements, parts of music pieces
Member	Timber, aluminium or other material, component part	Member	Player of ensemble, group, orchestra

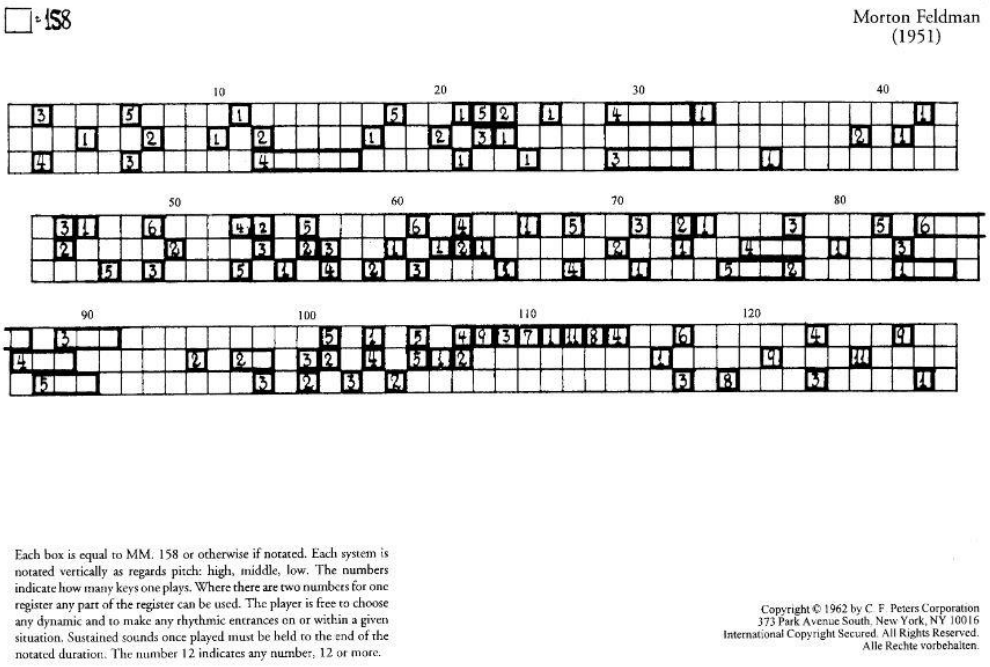
Material	Concrete, brick and block, mortar, metal, timber, tile, slate, plastic, glass	Material	Musical ideas, resources, new materialism
Function Constraint	Building use, Regulations & laws Client requirements Cost	Functionalism Constraint	Notes forming part of accepted system Client requirements and cost
Texture	Finish, striation, rustication	Texture	Orchestral texture, timbre
Repetition	Elements such as windows or columns, patterns	Repetition	Repeats, sequences, ritornellos
Resonance	Acoustics, inherent material properties	Resonance	Instruments, concert halls
Plot: Density Ratio	How many houses permitted on a given site plan area	Density	Score, number of players, audience, difficulty of music
Grammar	Sentences and parts	Grammar	Sentences and parts
New technology	New materials, methods, concepts, engineering solutions for planet earth	New technology	Largely electronic, computer based, even computerised instruments as Trevor Wishart
Sustainability	Design, methods of construction, post construction, whole life costs	Sustainability	Environmental music, sound art, experimentalism, politicisation

Table 1 Comparison of Architectural and Musical Terms for correlation of mutual translational possibilities, Grant Gover, 2018

Meeting ground—two-way? (See Chapter: Ancillary matters)

From **Table 1** it can readily be seen that there are strong similarities of terminology, with little if any disjunct, frequently directly translatable across the divide, which can be taken as the vertical line between the two sets of columns. They essentially talk the same language. The row with the least, nominal compatibility is that of Material. However, bearing in mind the deliberate simplification of the table contents, upon further consideration, it can be seen that bricks, blocks, sand and cement and sometimes lime making mortar and other materials, such as marble (using the material that Katrina Burton evoked in her Mies van der Rohe Carr Chapel cello piece, that music has building blocks. A full analysis of musical typologies, such as by early English and Italian composers, or Stockhausen, Nono, or Boulez, would easily show building blocks of musical elements of cells of music, themes, even layers of points in time or moments, as of Stockhausen. Elliott Carter's music can definitely be seen as cellular, of pitch class sets within pockets of asymmetrical polyrhythms (Link, 1994), and serialists (Guberman, 2015 debated Carter in the context of serialism) and others, such as Krenek and Stravinsky (Nagel, 2004), using Forte pitch class sets again can be seen to use maybe different coloured bricks to make patterns—an obvious exponent of this is Morton Feldman, where his scores can be seen as templates or blueprints for a building of musical construction, where according to strict designation of arrangement of tempos and musical sets a piece of music emerges, in the same way that a building emerges from the ground according to strict instructions as shown on drawings and elaborative details. In an interview with Jan Williams in 1983 Morton Feldman describes how he used 'metal, glass and wooden sounds' in his piece *Marginal Intersection* (1951), building materials if ever there were any, perhaps still staple materials of architects today. His grid scores, even the first one made in John Cage's place, whilst waiting for the wild rice to cook (Williams, 1983), is a drawing plan or blueprint with instructions how to build the music, even with a legend of what the symbols mean. Taking *Intersection 2*, page 1, the next score in the series:

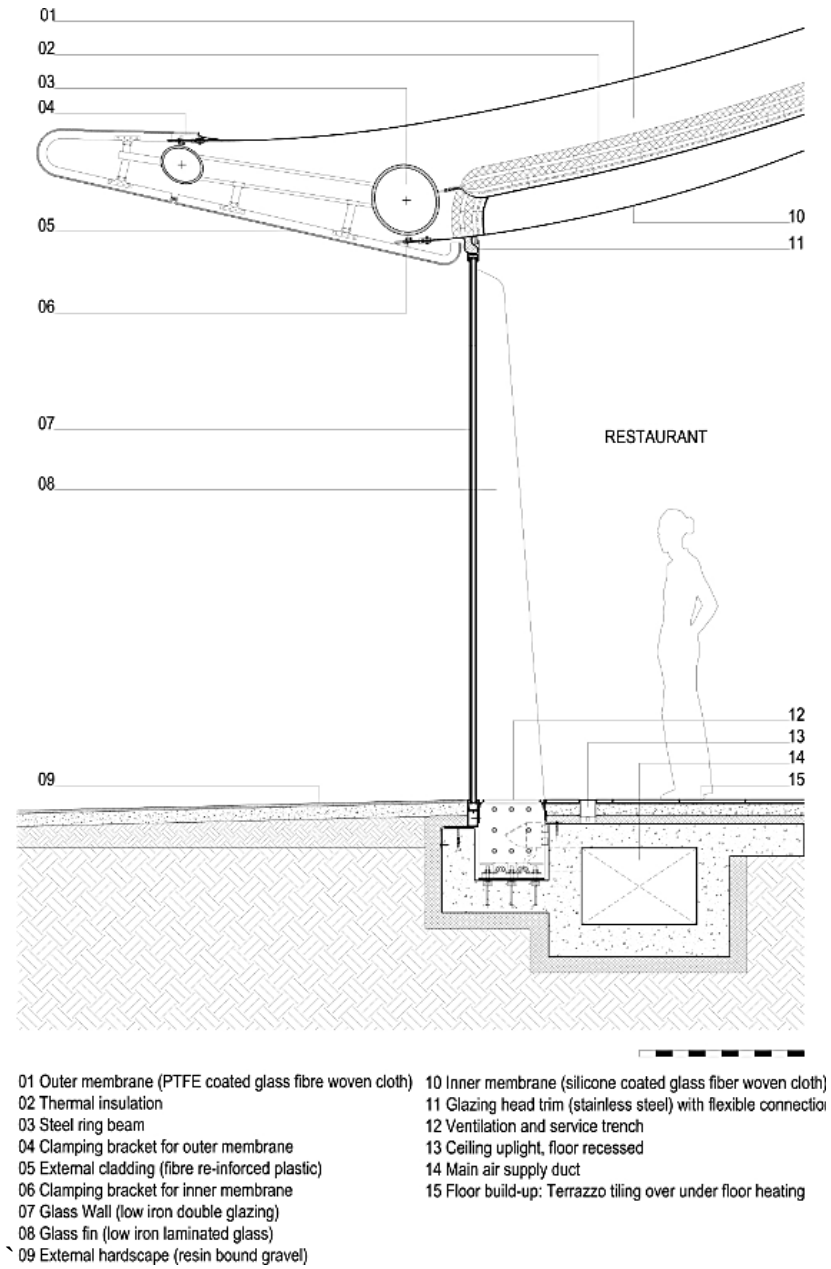
INTERSECTION 2



en.scorser.com

Intersection 2, Morton Feldman, 1951

It can be seen that the score is similar to a technical drawing which has building notes or instructions, here at the bottom left indicating the tempo, the number of notes in low, middle or high register and when to play. A certain amount of discretion is left to the player. The visual effect could be of a skewed checkerboard brickwork elevation, or a computer punch card, maybe for a Milton Babbitt type of composition, or simply a set of automated instructions, possibly part of a parametric architectural algorithm. Compare this with:



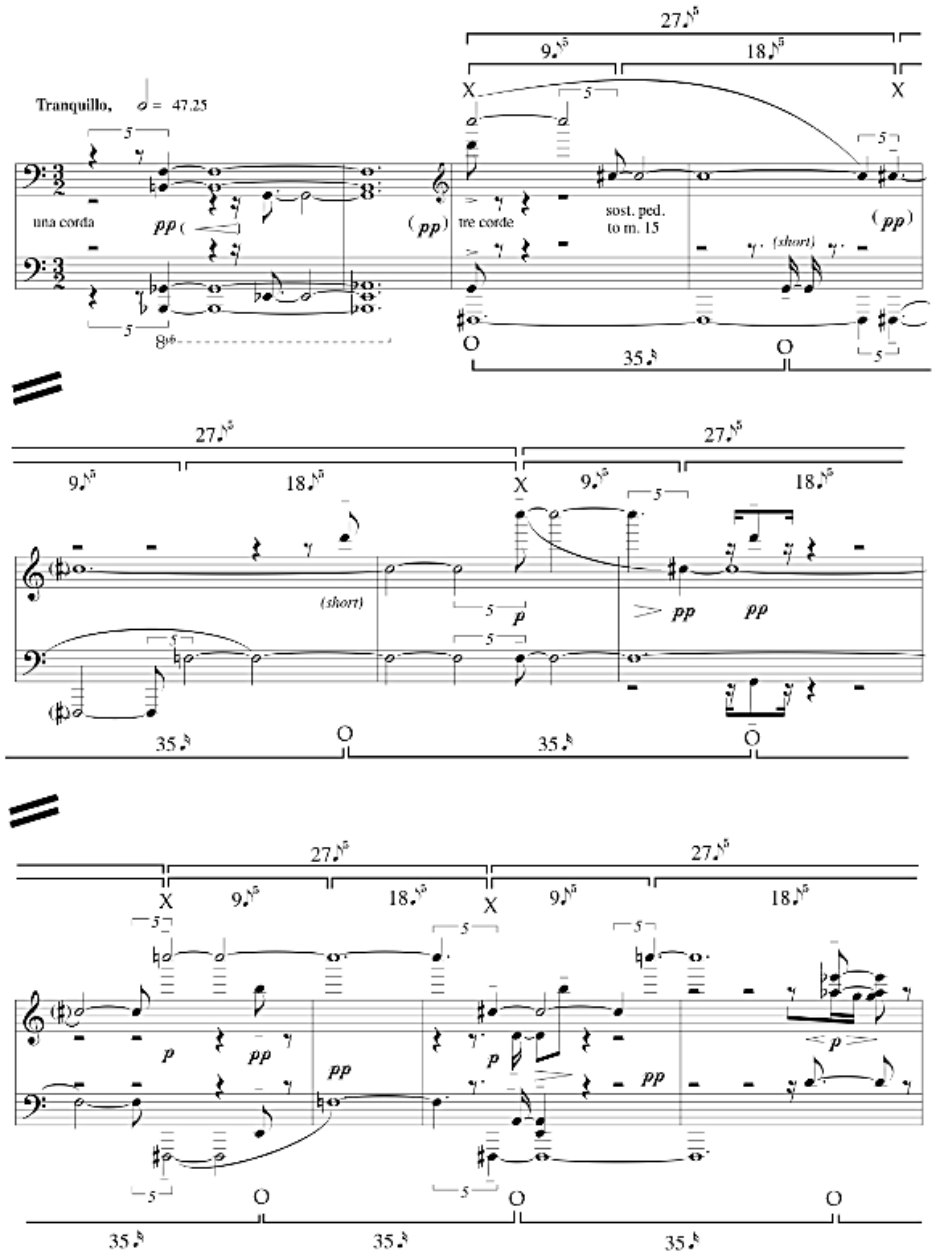
suckerpunchdaily.com

Serpentine Sackler Gallery, 2013, ZHA

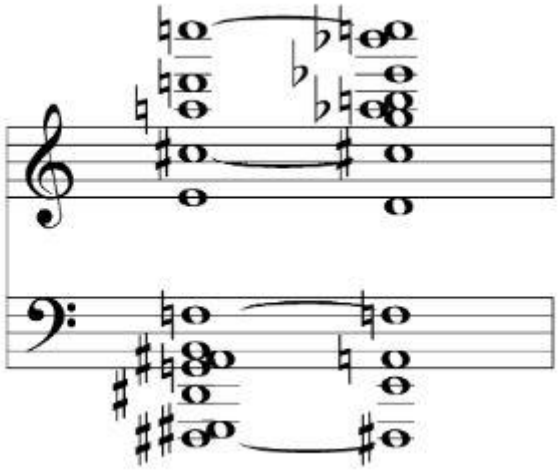
In the drawing detail above, building operations are designated by numbers and as Milton Mermikides (Glennie, 2018) does, the various shapes could be assigned numerical parameters, then assigned to a computer and realised as electronic music.

On the other hand, could a snapshot of an Elliott Carter score, *Night Fantasies*, bars 1-11, be likened to a building. It is taken from an article by John F. Link, where he shows that the whole piece is built up from all interval chords. These chords then are the building blocks of the music, where bricks and blocks are the components of a wall. The chords could, in fact, be derived by some semiotic means and thus form a

musical translation of a building. The chords resolving over these first 11 bars are shown immediately after this passage.

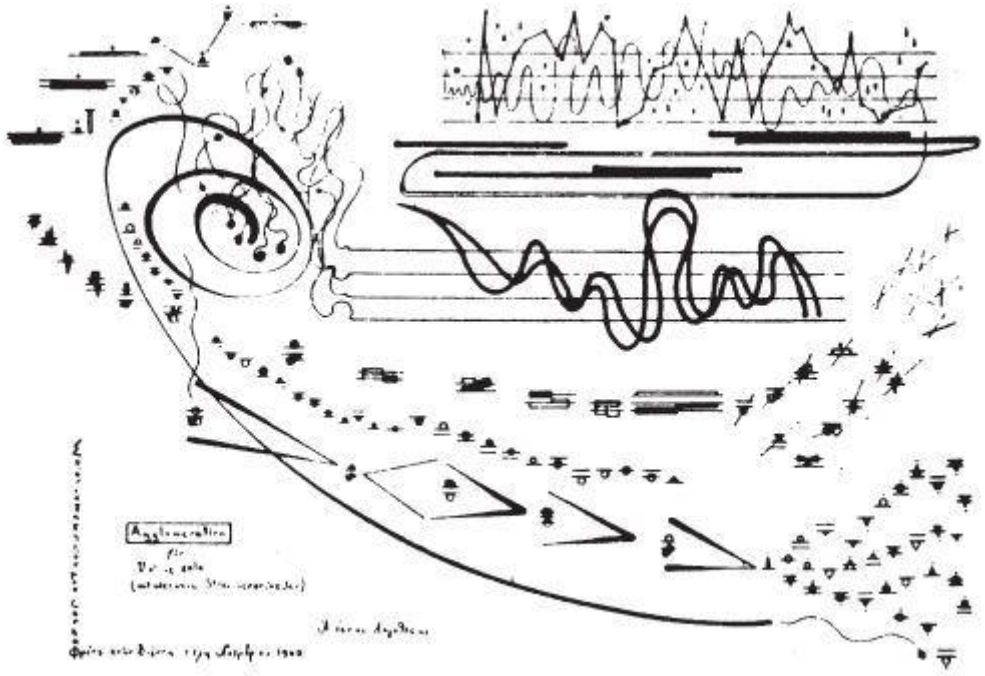


Night Fantasies, Elliott Carter, 1982, from Link, 1994

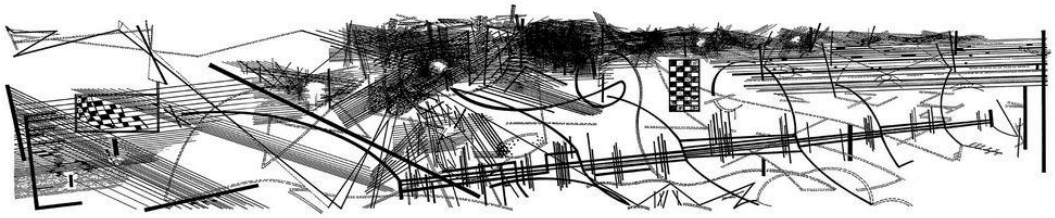


Night Fantasies, Elliott Carter, 1982, all interval chords, from Link, 1994

If the foregoing is not completely convincing, then to look at this the other way around, it would be difficult to tell which is the architectural and which the musical (and dance) graphic score (Frank, 2013). The first is from a unified dance and music score and the second from the Daniel Libeskind studio (1983).

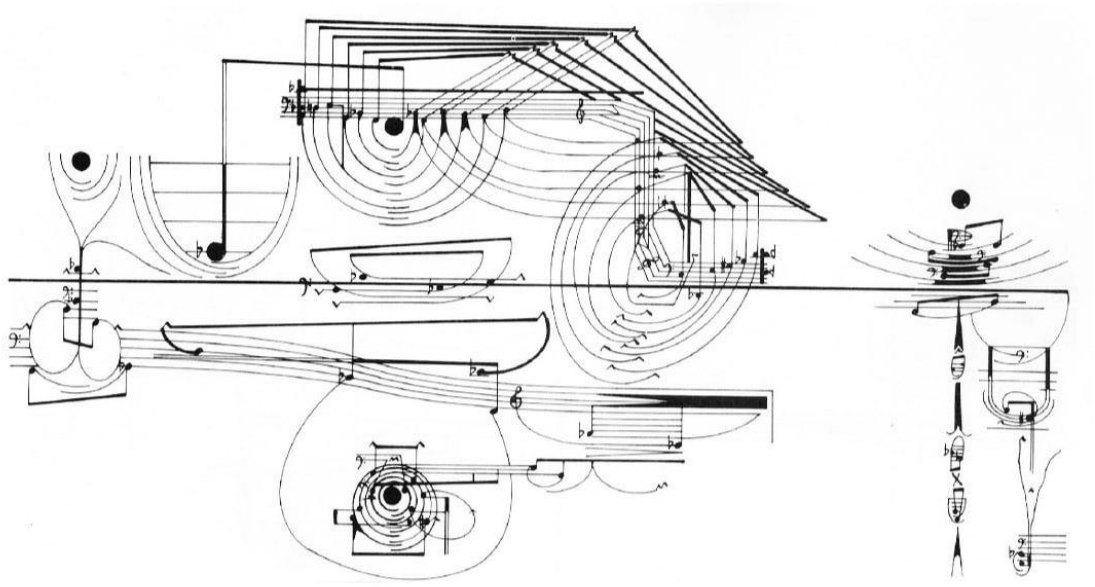


Jon Frank CoLab Graphic Score, 2013



Daniel Libeskind Studio, Chamber Works, 1983

The former was worked out by students, under guidance, learning dance and notation with reference to the Trinity library and Labanotation (Frank, 2013). The second was carried out by Daniel Libeskind when he was head of architecture at the department at Cranbrook Academy of Arts, Michigan, USA (1983). The architectural drawing of Daniel Libeskind clearly shows musical influence. This could easily be a musical graphic score, and the dance students' combined dance and music score shows some similarities to Libeskind's drawing and is clearly a music score—and both show some similarities with one of the most celebrated graphic scores, that of Neville Cardew's *Treatise* (1963-67) (Hall, n.d.), as below:



Neville Cardew, *Treatise*, 1963-57

It must be getting quite clear at this stage that in answer to the central thesis there is a conversation going on both ways between music and architecture.

Architects and music—some case studies

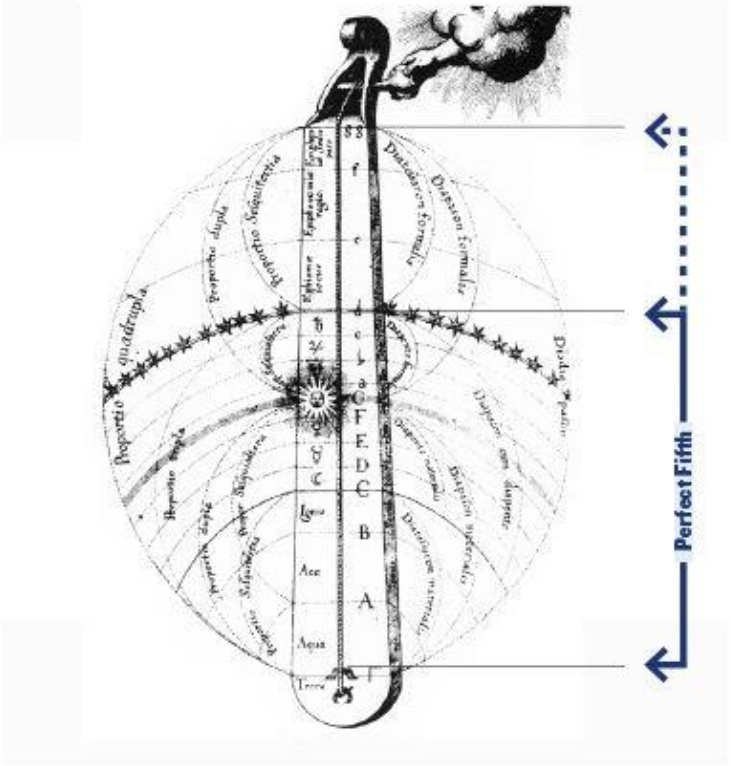
Charles Jencks, Aesthetics, Meaning and Translational Paradigms

The first architect encountered in this respect was Charles Jencks and he is a suitable exemplar to start with here, because his system and explication of the link between architecture is visual and self-explicatory. The very title of his article in the *Architectural Review*, 'Architecture Becomes Music' already attests to the fact of this thesis being true. Let us examine his main tenets.

He immediately states that the two share ' rhythm, proportion and harmony'. This is a somewhat classical view, but it can still hold in a modernistic sense. He cites some almost aphoristic assertions about music being the apotheosis of art (Walter Pater, 1877) and Goethe's famous statement about music being 'frozen architecture'. I would like to debate this, but I am generally trying not to get too side tracked. This had better go into the depository of items' for future research'. He quite rightly finds links with art movements such as Expressionism and Cubism. He makes an interesting comment about the use of computers in architecture, which is really the use of CAD, BIM and parametric modelling, of which Patrick Schumacher is such a champion. He thinks that architecture could 'reach its supreme condition once again and become its own particular kind of music.'. So, he is stating a case here for the potential supremacy of architecture. However, many people aver their own discipline as 'the queen of sciences' and so forth, such as mathematicians think that the universe can be essentially explained by mathematics. This really is immaterial to our argument, since it does not nullify the link between architecture and music.

In the vein of 'space' as a theme throughout, it is interesting that he avers that *Notre Dame,* France is 'spiritual' because of its nave's proportions being 1: 2.7, which he, tacitly, claims as a triumph for architecture, as a 'canonic whole' where architecture is appreciated as a whole, whilst music is temporal. This is another subject that I would like to have a hair splitting argument or debate about, but which I will immediately dump in the 'future' matters depository, for the same reasons as before.

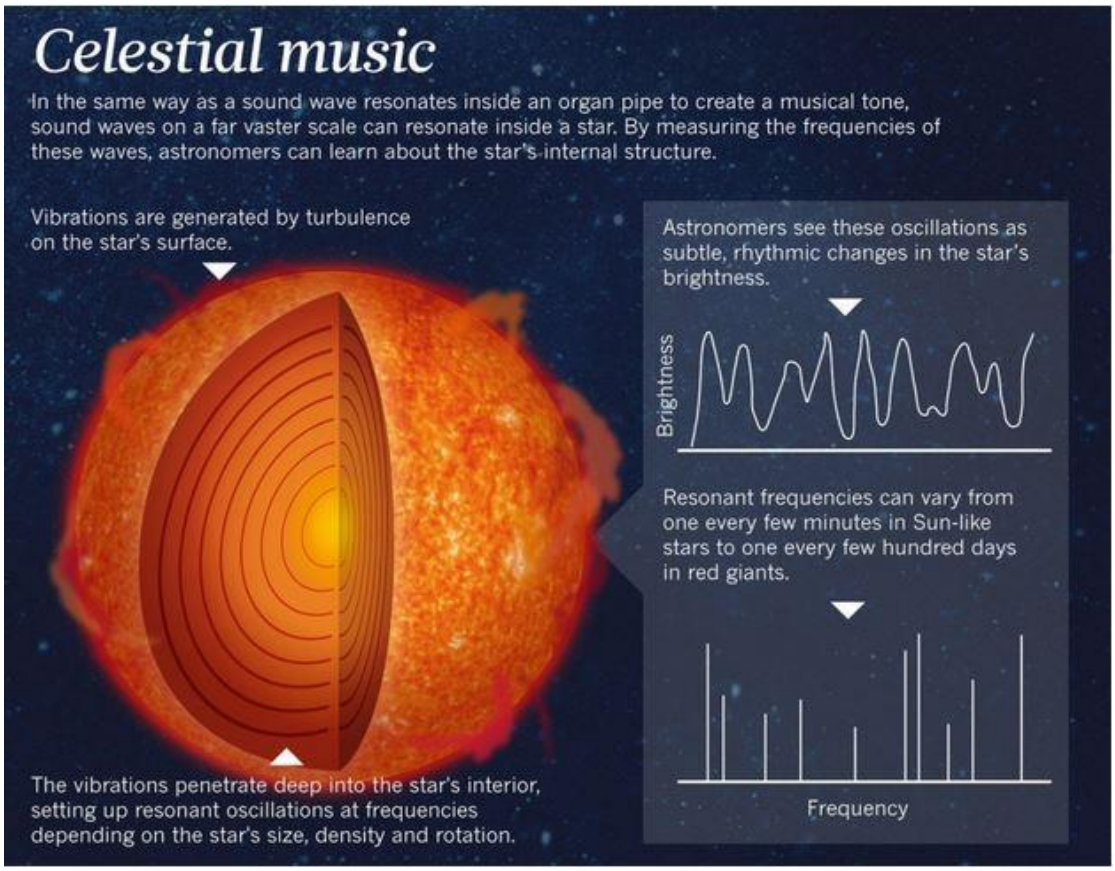
Under a heading of Cosmic Modes, Jencks outlines the numbers based Pythagorean view, citing the Renaissance Rudolph Wittkower's assertion that 1:1 is good because it represents a square room and sound 'repeating itself', the 2: 1 ratio of the octave and the 'double square front of a temple'. He cites the perfect whole numbers 1, 2, 3, 4, alluded to at the outset of this thesis, assisting to arrive at the number five for compositions and the ratios 3: 2, 4: 3 and so on, producing the harmonic series.



God fine-tuning the sun, moon, 'fire, air, water and earth' presiding over the cosmos, architecture was inevitably designed to reflect this music

Early view of universe measured by music, Charles Jencks and Megan Burke

The above illustration in Jenck's article in the *Architectural Review*, 6th May 2013, indicates the sort of view that music was divinely bound up with the construction of the universe. To a certain extent this may still be true. The Vedic *Om*, a quiet hum, believed to be said with the forefinger and thumb making an O shape, was held to be the actual start of the universe. These days NASA has recorded the electromagnetic signature spectra of planets as satellites pass and these when are lowered to human audible limits display unearthly, beautiful science-fiction-like sounds which in early days could be taken for the music of the spheres.



thespiritscience.net

Modern Music of the Spheres, Spirit Science, Steve Bancarz, 2015

The above website contains short clips taken from NASA's freely distributed recordings, explaining how the sounds are obtained to obtain a modern music of the spheres.

Jencks then moves on to explain direct linkages of classical temple construction quoted in full here:

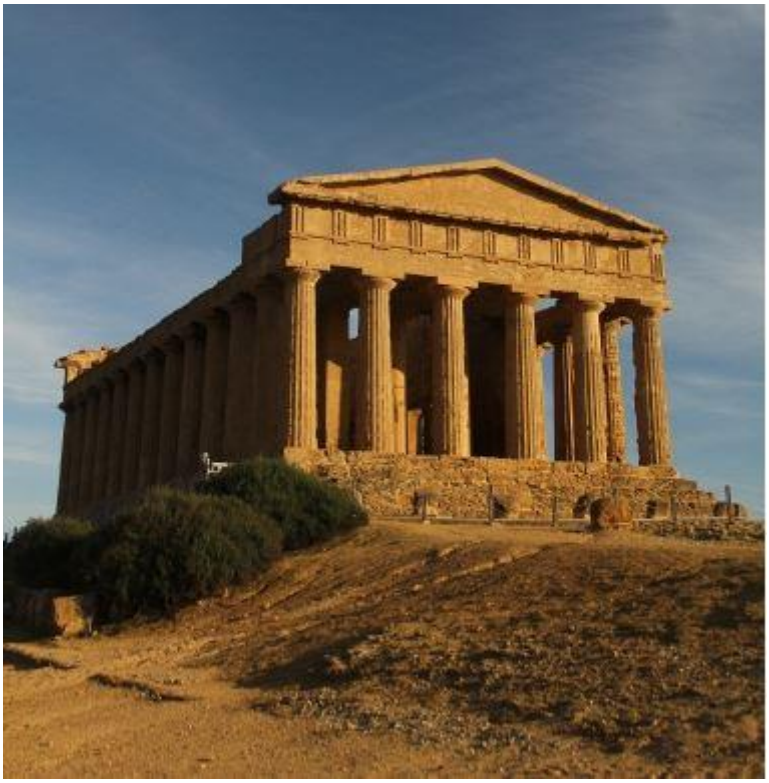
The Greek temple epitomised such connections [the perfect numerical relationships] for another reason, it was a building type created around musical performance, where the perfect form of the stones literally reflected the sounds of dancing, of flute playing and singing in procession. Its columns and intercolumniations created a steady beat of solid/void that was particularly staccato when seen head-on: A,B. These rhythms were conventionalised and named so the architect could speak the dimensions. He might say, 'Let us try the Pycnostyle, the fastest beat of intercolumniation.' The Systyle and Eustyle were for middling speeds, and Diastyle and Araeostyle used for the slowest, stately rhythms, but he would have been something of a pedant to have gone through the list of options. The fact is that virtually no layout drawings of Greek architecture or music survive (though like the Egyptians, architects must have scratched plans on the stones before construction). We do not even

know the notation systems of either profession, and it may well be that the composers of both arts 'spoke their creations' like little gods. This verbal creation was more likely in music, because it was taught as one of the seven great arts and committed to memory by hard training: geometrical ratios then united it to ceremonial architecture. In spite of this geometrical harmony, differences between the two arts emerge which are as instructive as the similarities. When the temple columns are seen more obliquely, the ornamental fluting becomes like a solid wall of vertical rhythms, and these accelerate even further with a tighter angle. How different this is from a symphony which cannot, ordinarily, be sped up or slowed down by the perceiver; or read backwards as architecture can be from the exit; or top-down as with a skyscraper.

Jencks' insights into the relationship of music and architecture in these early classical times are probably as close as we can get to a demonstration of such an early linkage, since he is right in saying that little if any records have been found. To substantiate the effect of the columns, since David Chipperfield won the RIBA Sterling Prize Award in 2007, I have held that the *Museum of Modern Literature am Neckar* demonstrates the effect that Jencks ascribes to temples as described above.

www.architecture.com

Museum of Modern Literature, Marbach am Neckar, 2001-2006, David Chipperfield, RIBA Sterling Prize Award winner 2007

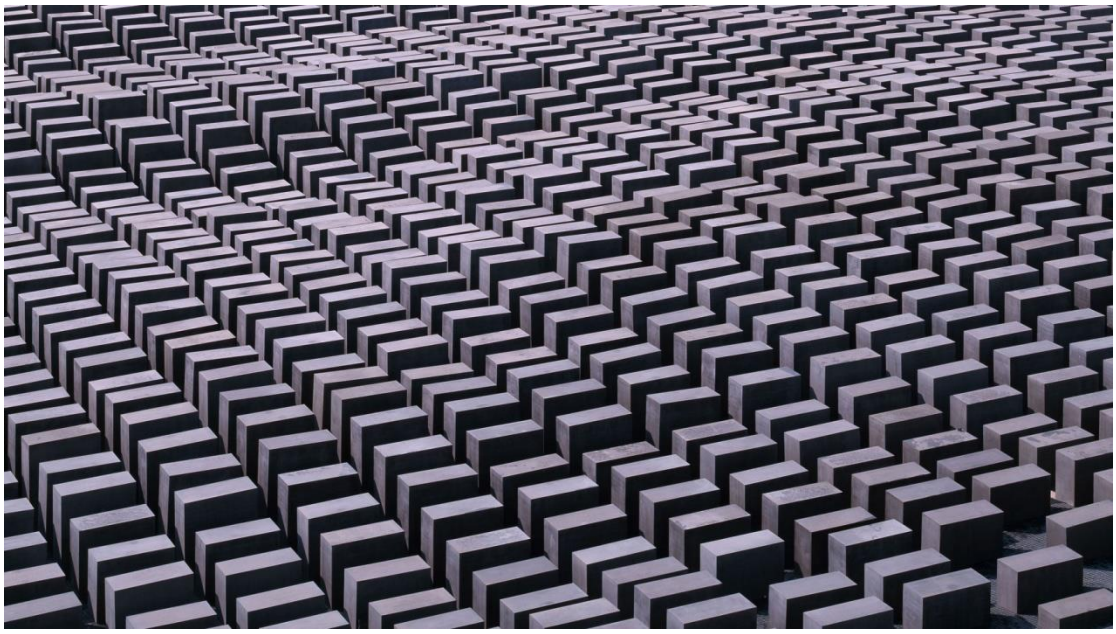


Architectural-review

'*Temple of Concord, Agrigento, Sicily, 450 BC. This view shows the Pycnostyle in front, and a screen of flutings on the side, because of viewpoint an even faster beat. Pythagorean proportions of column to intercolumniation, front to side, and width to height (roughly 2:1 here) also determine many other relationships of the Greek temple*' (Jencks, Architectural Review, 2013)

Comparing the *Temple of Concord* above with Chipperfield's *Marbach Museum* the point that Jencks has made and which I observed independently, to me, and hopefully to the reader as well, the existence of the rhythm of the columns, made faster, than as if viewed head on, by the perspective angle, is evident. To me, quite beautiful.

The temptation is to quote Jencks fully yet again, because he so accurately captures the essence of the union between architecture and music, regarding Peter Eisenman's *Memorial to the Murdered Jews of Europe*, Berlin, 1998-2005. However, it is necessary to put a personal slant on this, highlighting another example of music's union with architecture, or is it the other way around? The union is so poignant with the musical elements so bound up in the architecture that they both act on a level par. Instead, the musical references and philosophy rationale is taken from Peter Eisenman Architects studio, whilst drawing from Jencks and with own interpretation.



eisenmanarchitects

Berlin Memorial to the Murdered Jews of Europe, 1998-2005, Peter Eisenman

From the outset the musical corollary of Steve Reich's *clapping music for two performers* (1972) comes to mind in the dysphasic two main elements of undulating ground topology and the upper planes of the *stelae*. The numbers, 2,711 pillars, 95 centimetres wide by 2.375 metres long, suggest a Milton Mermikides data driven type form of music, and relentless, claustrophobic, hammering out of the point, or pointlessness, as the Eisenman studio commentary describes:

> In this monument there is no goal, no end, no working one's way in or out. The duration of an individual's experience of it grants no further understanding, since understanding the Holocaust is impossible. The time of the monument, its duration from top surface to ground, is disjoined from the time of experience. In this context, there is no nostalgia, no memory of the past, only the living memory of the individual experience.

Jencks continues his overt musical temple analogy, picking out a 'staccato beat', and black and white contrasts, as between day and night, A and B, 'presence' and 'absence'. He finds 'naturalistic meaning' in musical terms of a dirge trailing off into the distance, the whole effect like a Gothic cathedral.

He then enters into an engaging analysis of some continental cathedrals in a way that surely John Ruskin would have approved. It goes like this, further demonstrating a marriage of music and architecture.

Pérotin, the composer, and Gothic architects coincidentally, circa 1240, worked in *Notre Dame* cathedral on Ab rhythms, in music and colonnades and stacking of three or four melodies, often using chordal blocks, as well as levels of 'arcade, triforium, gallery, [and] clerestory'. The strong-weak beat musically was echoed in the arrangement of colonnettes on the weaker accent. The horizontal opposition of lines of melodies were not able to be echoed to the same extent architecturally, but Jencks claims that there were sporadic showing of architectural counterpoint in 'decorative elements', which he calls 'sub-rhythms'. He maintains that 'such oppositions [of music and architecture] have been emphasised since the 19th century' and enlists Walter Benjamin in 'enjoying a building inattentively', meaning that sitting on a stone bench in a cathedral such as *Notre Dame*, Chartres, ones view takes in the architecture at different angles to the music perhaps going on in the background, even if the music is as with Pérotin's stacked almost architecturally. He says that, regarding these 'oppositions' they are as different as light waves to sound waves. I would like to take this point up and debate it, but for reasons of brevity will avoid this, including not placing this in the further research section because the debate could then extend in abstruse scientific argument, but will simply say that perhaps they are not *so* dissimilar. Otherwise, he, of course, does find similarities of music and architecture. He then extends his analysis to other cathedrals, Noyon, Laon, both with four levels and Chartres, with the levels 'synthesised' to a 'classic' three. Then, the elements are 'squeezed and stretched' into the upper light filled spaces at Reims and Amiens. He ends by stating:

> Little mouldings buzz along the horizontals that accentuate the melodic lines, while more and more colonnettes whiz up the verticals accentuating the harmonies. The great architectural dialectic of horizontal versus vertical forces starts here and culminates in the early skyscraper .

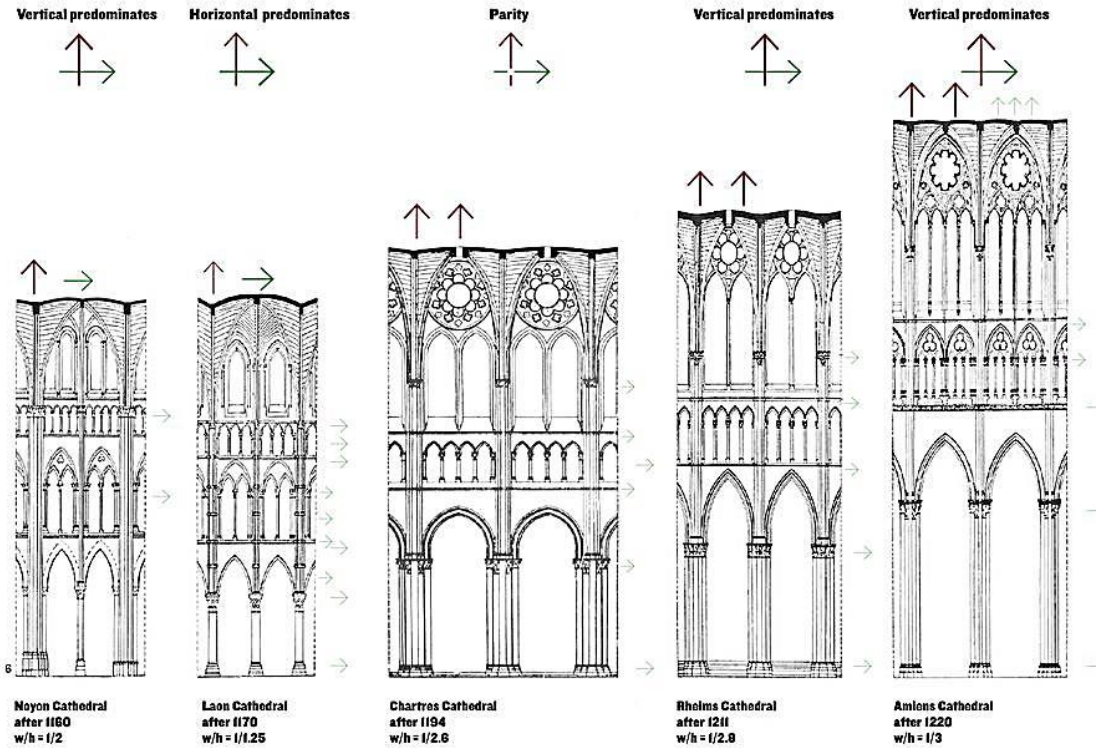
He illustrates the foregoing neatly as follows. Note the increasing scale, 1:2, 1: 1.25, 1:2.6, 1:2.8 and 1:3 (see below Diagram: Charles Jencks). To an extent the technology and proportions of cathedrals foreshadow possibilities in architecture generally. Does music then follow trends in architecture? The section on style comparisons would seem to indicate so. Notice, also, the evolution of the vertical predominance over the horizontal. In music this vertical/ horizontal discussion

continues to this day. In the twentieth century, Stockhausen experimented with layers, points and moments and other elements vertically. In Bach's day of the Baroque, 1650-1750 approximately, later than the current High Gothic period being discussed, there was a lively interplay between the clear strands of counterpoint. Jencks states that the oppositions are 'pushed to greater and greater pitch, as the dialectic of visual forces dissolves the wall'. This reinforces my wish to visit Chartres cathedral, which seems to possess the perfect three (Calter, 2008) of vertical large architectural elements, together with the Gothic decoration as Jencks so vividly describes. Whilst Pérotin explored the growing uptake of the perfect chords and those closest, octave (*diapason*), fifth (*diapente*), fourth, third, major, minor and so on, including the Vitruvius Man of the classical era (Jencks, 2013; Wiles, 2009), Leonardo de Vinci and later Corbusier (Wiles, 2009) with his Modulator incorporating Fibonacci relations, in turn related to the Golden Section, all as outlined by Calter in his *Squaring the Circle, Geometry in Art and Architecture* (2008), the 'fizzing decorations' seem to bespeak sheer floridity of musical interpretation. One will have to wait until confronted with the monumental edifice in front of one—and then the reaction should be as with photography to take the view at the very instant recognised, rather than moving on and taking a more composed picture, to go with the first impressions and notate them there and then on the spot. Afterwards one can record for the log ones thoughts and feelings about the interplay between architecture and music—and by now, at this stage of the research, the realisation is that architecture, as with everything else, as the TFT informs, is not just buildings, not just drawings, models and so forth, it is people, histories, stories, myths, expectations, hopes, dreams, so much more besides: so one will respond to the surroundings, the people as they move about the cathedral, whether as tourists and or users, service attendees, those seeking a spiritual answer.

` Before moving on, there would also be the integration of the appreciation of the structural element already hinted at. This would no doubt all seep into one's appraisal, fusing emotional feeling and intellectual reasoning together with the musical response: the stone massing, the joints, the marvels of setting out, carving, scaffolding, hoisting into position (unfortunately with less benefit of modern Health and Safety regulations) and inevitable accidents, yet with precision and sometimes more craftsmanship than is evident in a deskilling industry nowadays, the marrying of timber, stone, glass and metal, early paints like egg tempera, and the fabulous *lapis lazuli*, gilding, the tracery, sprockets and rockets (in musical Mannheim terms),

gargoyles, carvings, screens, the widening of walls, arches, arch barrel vaults in various configurations, window technology increasing in size as spanning is extended, ribbing confusing the perpendicular periods with Gothic, the transfer of loads, with use of buttressing, the, probably then unintended, effects of 'thermal mass' of the massive stonework, similarly, acoustical effects, possibly more intended as based upon 'golden ratios', quoining—and then the stained glass, which Jencks is about to comment upon. This massivity, the aim of reaching up to the heavens, to God, like modern skyscrapers, has a net effect upon 'space', all these elements coming together to create the 'space' that so many have lost in the modern age of functionalism (see topics for further research).

Diagram: Charles Jencks



High Gothic evolution of arches, columns, intervening spaces, secondary columns and decoration of cathedrals mirroring the music of Pérotin,
Charles Jencks and Megan Burke, 2013

It is interesting that Jencks likens modern day ‘spandrels’ and ‘I-beams’ to ‘triforium’ and ‘colonnettes’. Spandrels are sections of walls under arches, or, more prosaically, can be walls panel under windows, in, for instance, system built educational blocks, and, I-beams, when hyphenated, can designate a cheap form of flooring beam reduced to its minimum made of softwood and plywood, or, usually unhyphenated, steel RSJs (Rolled Steel Joists), or UBs (Universal Beams). Whilst generically perhaps true, it may be that there is a certain amount of hyperbole to this, which cautions one against over empathising with all that Jencks has to say, yet his general thesis that music can be literally read from architecture seems true, and his examples are quite explicit.

Jencks then proceeds to draw parallels between music and architecture in a number of ways. They share emotive qualities, which for him is a big point. Certainly, for music this is true. In the field of psychology, the camps are generally drawn into *emotivists* and *cognitivists*, where cognitivists admit that there can be a component of emotion (Grewe et al., 2007). It therefore seems reasonable to admit that, taken in the round, emotion *is* significant in music appreciation. And there would be hardly any architects that do not admit of emotions in architecture, possibly the driest most modern of architects of which it is hard to think of a single example. Even Peter Eisenman, who might begin to fit this description admitted finally in an interview with Imam Ansari (2013) that despite all his theoretical modernistic and postmodernistic view of architecture and life that in the end he espoused thinking of architecture for humans where ‘affect’ and outright emotion play a part, with subjectivity being an ideal. He discounted the Berlin Monument as a one-off and as such could not be judged within the ambit of his canon of work and yet, dialectically, as both emotional, and beyond emotion as noted above (Ansari, 2013). In fact, does not this extreme reaction, and understandably so, further endorse his emotionality, where the utter seriousness of the subject takes emotion which is there and place it on a new level, as amortised, yet there?

Having established emotionality as a joint factor of music and architecture, other similarities that Jencks evinces are: in so many words, super star status: Vivaldi and Michelangelo, Monteverdi (an innovator in opera— also, crossing into exploring architectural space in Saint Marks Basilica, Venice) is paired with Borromini (an innovator of ‘spatial concepts’)—and then he goes into his own territory and lists a range of architects, which are listed here to indicate those whom he considers important: Ando (a Critical Regionalist, Ekshikaa, 2012), Zumthor

(whom Eisenman does not rate at all (Ansari, 2013) since he is too concerned with materials from a tactile craftsman's point of view, which demonstrates a limit of Eisenman's emotional connection for whom materials are more of an abstraction. I, personally, like Zumthor, perhaps for the reason that Eisenman does not: for me, he has a feeling for his architecture which is sympathetic to nature, the soul, sustainability), Eisenman (perhaps a leading spokesperson for deconstructivism), Gehry (one of the innovators of uniting architecture and structural engineering in instantaneous use of CAD with an integrated design team, for instance the Twin Towers of Prague evoking Fred Astaire and Ginger Rogers: just pulled up, showing typical funny angles that only CAD can do), Hadid (another leading deconstructivist), Libeskind (for me the 'wunderkind' of architecture, also a deconstructivist), Wolf Prix (perhaps in the same bracket as Eisenman), Koolhaas (one of many modern 'urbanists', founder of OMA, and AMO research division, also with work in MoMA), Herzog & de Meuron (famous for the Tate Modern with exposed services inside and black painting, and Laban Dance Studios with novel use of subtle multi-coloured wavy fabric exterior wall finish), Calatrava (engineer-architect, famous for flowing geometric shapes, often finished white), Balmond (writer of *informal*, design manual using points, and influential structural engineer calling for unification of architecture and structural engineering), Greg Lynn (influential innovator using new technologies, materials and computers. Jencks calls him a 'Blobmeister', which is true to a certain extent, maybe not doing full justice to the architecture, which is organic)—then comes Patrick Schumacher about whom we have written a fair amount already (to recapitulate: in essence he is a parametricist, extreme urbanist and to be fair he does have a utopian dream which could be described as sociological ethical—he would say that he is facing up to home truths about the future, which for him is firmly in the city). The architects Jencks calls Starchitects. Is there a case for thinking of Barthes' The Death of the Author (2017) in connection with architects where their narratives are interfering with the truth of what is happening, what the core of society really wants?

Jencks cites Reyner Banham in 1968 as saying that there have been no new forms in architecture since Le Corbusier. This must be plainly untrue. Witness the previously unbuildable forms of Zaha Hadid, which others such as Daniel Libeskind and Frank Gehry are also party to, made especially possible by the use of computers and their applications, such as CAD and integrated systems that carry out calculations for structural possibilities, not to mention air tightness, carbon dioxide

index levels, insulation values, costs and manufacturing methodologies such as CNC and printing. Shapes of walls and bending of materials into anything that can be imagined with the use of a computer is surely inventing new forms. In respect of Pérez-Gómez's and Joseph Rykwert's reservations about CAD as noted by Saletnik (2018) they are in fact picking up on a new phenomenon, albeit, one they have reservations about, where this newness is associated with new manifestations of designs, which must imply new forms. The reservations about CAD may well be validly founded. There are still those around who object to the machine made look and feel of CAD designed buildings. Andrew Clague still seemed to show affection for the hand-drawn, whilst most of the designing by his younger staff was carried out by computerised CAD, albeit sometimes mixing it with some hand-drawn elements as well as Photoshop elegance added into the process, thereby ending up with a professional and polished look to the drawings, which works well in presenting schemes to clients (**Appendix A**). And, no less an architect than Peter Eisenman showed a positive distaste for computer use over manual drawings, which to him were of such personalised reality and of a vital semiotic importance (interview with Ansari, 2013). From my teaching and use of CAD I can empathise with these feelings, since I can invariably tell a CAD designed building at first glance, so different from a Lutyens, an urbane idiosyncratic architect, for instance, like analogue versus digital binary. Whilst it *can* afford undoubted new forms, it has some limitations in some detailing, use of libraries, the readily available mathematical functions that assist and tend to smooth out forms. This is one of those topics deserving of great in depth analysis. It is not all bad, simply what is new, and technology related. Can one really be a Luddite and stop the march of computerisation, intelligent systems, the new technological age? The answer is plainly no and every indication is that it will only increase, so it is a new world, with new solutions to engineering and architectural problems, and new forms. What is the effect upon music? In simple terms, the text that is offered to translate into music is not only different from previous historical modes, but would tend to suggest a technological even industrialised solution to producing the music. In other words, the computer age is upon not only the majority of architecture, but music. This is definitely worthy of further examination and will be worked out by the time decisions are made as to how to make music for this project. Maybe even during.

Returning to a more explicit connection between architects and music, Jencks points out that 'Libeskind, Gehry and Prix have composed parts of their buildings

with inspiration from Schoenberg and ’60 pop music; while others are pushing explicit compositional forms: Eisenman, Koolhaas and Hadid.’. He uses the words ‘composed’ and ‘compositional’ where his intention is quite clear. If one wanted no other proof of the linkage between music and architecture, bearing in mind Jencks standing in the world of architecture, together with a clear knowledge of musical matters, then this would suffice. Another point to take from this is as regards the sharing of forms. Further evidence of Jencks’ analysis of music to read from architecture will follow, also this will provide useful signposts, suggestions for at least one means of translating.

Jencks then returns to a sort of poetic imagery of architecture in musical terms, quoting Le Corbusier and Louis Khan. He remains still in the classical world of temples, citing the Parthenon, also the much later Taj Mahal. Jencks almost strays into the territory of ‘topic’ theory of which Mozart was an exponent on occasions, especially when composing for audiences that would have recognised and appreciated the references (McKay, 2017). The parallel here would be designing to stereotypical tropes, which can happen. Town Halls, status symbols for banks, offices to symbolise brands, even buying into current styles for any type of building, such as airports, stadia, the list goes on. The counter argument is the same for architecture as for music: Adorno (2004) and Heatherwick’s advocating of a *Manifesto: Towards a New Humanism in Architecture* (2018). This manifesto verges on ranting, yet there is a cogent point to always be wary of the new very quickly falling into the ossification of history, the debate surrounding Adorno at Darmstadt after World War II (Iddon, 2013). The rant against sustainability must be taken with a pinch of salt given the findings of the Intergovernmental Panel on Climate Change (IPCC, 2018), the Paris Agreement (2016) and the MET Office (2018).

Before moving on, in continuing use of Jencks’ article on music and architecture, as a centralising template, teasing out discussion and information relevant to this thesis, an important point made by the Blobmeister, Greg Lynn, needs to be highlighted. I would like to use him as a case study for a pivotal argument about design in music and architecture before and after a pivotal point, here Lynn’s revival of Bateson’s ‘symmetry breaking’ of 1894 (Lynn, 2005).

The reason is this: his example in a Ted Talk of the arrangement of stair sections for a Korean church in Queens, New York, demonstrates the difference between new music as developed from the initial debates at Darmstadt referred to above (Iddon, 2013) and the music of the nineteenth century and before, essentially

the same as for architecture. The difference is of the breaking the shackles of the former rules of beauty tied up with the Golden Section, whole number numerology and symmetry, and the new application of calculus and infinitely arbitrarily assigned differentiable quantities, where symmetry is seen as an indicator of weakness, something not working properly, rather than an indicator of beauty. The parallel here between architecture and music is direct. An image of the church in question is shown below. This will be followed by a near facsimile made by me in AutoCAD 2016, but adhering to previous precepts of copying and previous notions of 'what looks nice' proportionally. Using Greg Lynn's wording, the 'distances', 'dimensions', 'connections' and 'angles' from these connections are all different; they are not replications of 'typology', they are differentiation of 'traits', so that each section is intimately connected with the whole, but they are unique entities within the overall form. This is precisely the argument that Adorno and others had at Darmstadt. To what extent is newness to be espoused within a context of form, possibly self-referential form, perhaps most personified in Adorno's *vers une musique informalle* (Iddon, 2013). The answer musically, as pointed out by Martin Iddon, is that it was not a total thing. It was not all serial music, or abandonment of it, or indeterminacy of Cage and David Tudor and so on (Iddon, 2013). Maybe a hybrid is the solution, like the expression 'a good old fashioned British compromise'. But, sometimes compromise can water down the really innovative creative solution. In Lynn's theory there is no compromise. Or is there? He still acts like an architect, considering the whole and the relationship of parts to the whole, including as he calls it 'holism, harmony (still there, not abandoned with 'symmetry breaking'), proportion (still also there), and synthesis (an important word for him expressing full integration)', the usual considerations of openings (doors and windows), escalators, colours and other elements. No doubt he has to juggle with real world matters of clients' requirements and budget costs. He does deal with Vitra and Alessi, both commercial companies dealing with houseware items, yet his example of coffee cups made from exploded titanium and his proposed housing development do not fit the usual idea of even a Frank Gehry CAD extruded design. So, the question then remains: is this a model for new music? Does one throw away all the previous classical notions of beauty, even Darwinian ideas of adaptation and employ 'variety' as opposed to 'variation'? I will leave this hanging there for later decision-making on musical interpretation of buildings.

Greg Lynn TED2005

Korean Church, Queens, New York, Greg Lynn FORM, 1999

From various websites, including *richelle db* (2017), a video inside the church from Anderson (2018) and Glen Lynn FORM's own website, the church works as a church and has many, as it were, normal features to do with light, internal and external layout and usual elements, so it is not just a Blobmeister's 'blob'. In fact the church was listed by the NYC Landmarks Commission 'as one of the thirty most important buildings built in the city in the last 30 years.' (Greg Lynn CV, 2013). To be fair to Jencks, it was probably Lynn's own responsibility for being hailed as a Blobmeister since he has either written or been written about in twenty-one articles or papers in this connection according to his CV (2013). He is interested in new topologies.

Greg Lynn TED2005+AutodeskCAD2016

Korean Church, Queens, New York, Greg Lynn FORM, 1999
Alternative schematic, regular distancing, without ‘sequence break’,
Grant Gover, 2018

The above is my own rendition of how the panelling to the stairs could look when Lynn’s disjunct system is taken out of the equation. Which is better? It is like saying, which is better, order or chaos, or tonal or modern music? Surely there is a case for both, but, certainly when juxtaposed like this, the uniqueness of Lynn’s approach is interesting and does lead away from the mundane. I think I hand it to Lynn. Hats off!

Coming out the world of modern computers and organic architecture, Jencks brings us straight back to a rhapsodic, musical account of one of Daniel Libeskind’s *tour de forces*, the Jewish Museum in Berlin, which he says is better than Eisenman’s memorial discussed already. They seem to evoke similar feelings, of emptiness. Libeskind is concerned with voids and absence and no answers. Eisenman similarly offers no solutions. In his interview with Ansari (2013) he mentioned holes in the ground and entered a rather typically specious, yet for him it seemed heartfelt, discussion about whether the holes were empty or the ground had empty things called holes and again it was all symbolically ridden, semiotically of the Derrida sort, and in Berlin, to do with ‘the wall’ and abutting walls 3.3 metres high where people walked on top, seeing below the past that they had now escaped from. This was patently a redemptive moment for Eisenman. Emptiness is a concern

of the TFT where by implication vacuum in space is imprecated and yet where from quantum physics we know it is seething with life. Howard Jacobson realised that one way of understanding the Jewish Museum was to view it from the sky and piece together understanding of the Star of David, the overall plan of 'prison and metaphysical conceit, all at once.'. One of the TFT's conclusions is that infinite perspective is needed to understand anything. In ordinary life we do not always have this luxury at hand, so to get any perspective whether from an architect's point of view or life's is a bonus. We can perhaps only get glimpses of sublime understanding. Have the two Jacobsons and the others mentioned, in fact Bettina Matthes, Andrea Huyssens, Helene Binet, possibly Esra Akcan, James Young and Amy Sodaro, Victoria Bishop Kenzia, Menashe Kadishman, all the other visitors of all nationalities, and Jencks started to achieve this? Is it as musical as Jencks thinks with his analogies of 'the visual tropes' and their 'musical counterparts': the 'zigzag path', 'the slashes and cuts in the exterior grey zinc', 'oppressive concrete walls', 'liberating views of the sky', 'the play of violent diagonals versus a background of neutral grey', the 'long thin stairway, punctured by angular struts and underscored by dark stone […] a descending base-line that repeats again and again – 'going down, going down' […] sadness, as stereotyped as using a minor key in the context of death.'? Can Architecture and Music both move and touch in the same way? – as now listening to Jacqueline du Pré playing Dvořák's Cello Concerto in B minor, Opus 104, which almost shares the famous architectural arch of The New World Symphony, No. 9 in E minor, Opus 95 from beginning to end, the answer to these questions seems to be: Yes.

Both the Jacobsons and Bettina Matthes noticed one of the three axes running through the museum, Continuity, the other two being, Emigration and Holocaust, was dealt with the least. Roddy Jacobson noted that the conventional museum part stops showing Jewish history as integrated into Germany at the Holocaust, thereafter nothing. No answers are offered. Roddy Jacobson sums up saying: 'Germans are unable to move past a perpetrator, guilt mentality'.

What sort of music suits this sort of bleak presentation of facts? Personally, Albinoni's well-known Adagio, as offered by Jencks, is too pastiche, perhaps because it is too well known. Perhaps if one extricated the music as listening for the first time, then it is valid. For me the rhapsodic, outright romantic music, full of sweet life, of a personal favourite composer, Dvořák, is a perfect foil for the

greyness, window slashes, lightning zig-zag, void, nothingness, what could have been.

Could a contemporary German musician suit better? Perhaps Helmut Lachenmann? His *musique concrete instrumentale* might evoke the sounds inherent in a place, but it would perhaps speak of the concrete but not the history, the memory, the nostalgia. Mathias Spahlinger, with all of his modernistic touches and heartfelt political egalitarianism might express oneness of all peoples but his broken interjectory sound however conceived and admirable would possibly pass by the essential point here. Perhaps Wolfgang Rihm, the modern Beethoven, as Sillitoe (2017) can hear early influence, then moving to be more like Bartók, Hindemith, Shostakovich or Schoenberg in connection with his *Geste zu vedova*, *Streichquartett in g*, *Streichquartett (1968)* and *Epilog*, should be the spokesperson for the German position? Or, his protégée, Rebecca Saunders, who works within a tactile timbral sound world, yet with deceptive ferocity, even anger. Is anger needed at this stage? Libeskind is Jewish and deliberately chose to create disorientating experiences but left comment out; that is up to the observer/ listener/ participant. Perhaps in the mode of expressing the general futility of war, which the museum does as well in its exhibition space, an apt composer and piece, which also echoes the abrupt ending of history for Jews in Germany with the holocaust as expressed by the museum, is *Quatuor pour la fin du temps* (1941) by Olivier Messiaen.

A commenter, Roberto Suárez (2014), to Ligeti's String Quartet No. 2 played by the Arditti quartet (1968) summed up quite accurately:

> Schonberg said every music is associated to some non-musical object or reality. In this sense music is a vector that connects us with this reality, whether it is real or is in some plane we have never experienced. In the latter case the object resides in the mind of the composer or in another unexplored dimension. In the romantic period the reality was the space of inner feelings. That had to end to go beyond. In the end you just have to let the composition take you to its own reality.

This sums up the subjective aspect of music. In the psychological study mentioned earlier by Grewe, Nagel, Kopiez and Altenmüller (2007), the subjectivity angle is examined from the point of view of recorded feelings and bodily arousal. There are difficulties surrounding such research to come to definitive conclusions. Nevertheless,

they did in effect come to the rather obvious conclusion that people react differently according to their knowledge of a particular piece of music and its genre. As mentioned earlier, the cognitive and emotional domains are connected, so whilst a reaction component may be cognitive and not emotional, it may still lead to an emotional response. Patterns seem to play a big part and unexpected occurrences in music. Perhaps the shocks of coming upon the different areas in the Berlin Jewish Museum fit this category, although Grewe et al. do state that 'music is a dynamic aesthetic stimulus in contrast to paintings or architecture, for example, and people seem to react in a dynamic way.'. This sort of statement seems to be in line with Stravinsky's famous statement about music meaning nothing (although he did seem to contradict this with later statements) and Goethe's statement about architecture being frozen music (although the other line often not quoted refers to music as liquid).

As with other points occurring throughout, I would like to take up this challenge and contest it, but feel that I must exercise self-discretion as to where and when to develop arguments. I will make a comment about it in the section reserved for further study suggestions, also rely upon the what I consider to be self-explicatory evidence emerging, especially from Charles Jencks' sometimes emotive evocation of the link between architecture and music, whilst at the same time indicating dynamic elements to music and architecture alike (incidentally, structural analysis of buildings may often be of the 'statics' sort, but it can just as well be analysed 'dynamically' where appropriate, for instance with complicated wind loadings). Grewe et al.'s concluding remarks referred to 'individual experiences and associations' and rather unexpectedly for an empirical research their final sentence reads as: 'We can be moved or motivated by music, but our "free will" and former experiences remain active components in our reactions.'.

In another psychological study, Emery Schubert (2009) surveys the roles in music of language, semiotics, communication, information flow, culture, evolutionary theory and philosophical concepts such as phenomenology and the Kantian 'sublime', also metaphysics and religion. Whilst he admits the definite role of communication and the existence of several advocates of this as music's main function (Newmeyer, Chomsky, Searle and Lin), his thesis is that the main function is to do with the 'pleasure principle' and that where necessary this is turned off or 'dissociated'. He cites Huron as agreeing. Indeterminate music, noises of trucks or any sound can be music when this principle is applied and culture can have a 'neutral' role. There would be many who argue for a greater significance of culture than this, such as

Shepherd and Wicke (Tagg, 1997). For Schubert the usual structural elements of pitch, rhythm, tempo, narrative, possibly associated movement and so on are not the essential prerequisite. It is the auditory signal, which is then processed in the brain in whatever part or parts of the brain providing the 'pleasure principle' with whatever parts of the brain are 'disassociated', possibly in the limbic system (reference is made to work on this area 1999-2003 by Brown, Martinez, Hodges, Fox & Parsons, Perez & Zatore, Ramachandran & Hirstein, Tillman, Janata & Baharucha and Krumhansl).

As regards the other usual structural elements ruled out by Schubert, it would be useful to go through some of these as highlighted by Alf Gabrielsson. They might throw further light upon the running analysis of Jencks, elucidating further structural similarities of music and architecture and possibly provide some suggestive means of composition. This might also help with a final assessment of meaning obtained by some listeners.

For Gabrielsson, structure is: tempo, loudness, pitch, intervals, mode, melody, rhythm, harmony and formal aspects of repetition, variation and transposition. I can add more, such as form, sentences, clauses, phrases, paragraphs, episodes, ritornellos, codas, codettas and fugues. There are many more. This serves as an idea of what is involved. Gabrielsson and others, such Lindström (Gabriel and Lindström, 2010 in Gabrielsson, 2016), work out the effect on listeners of each structural factor as well as in combination. For instance a fast tempo could induce anything from: activity, excitement, happiness, joy, pleasantness, potency, surprise, flippancy, whimsicality, anger, uneasiness and fear. Whereas, a slow tempo could induce: calmness, serenity, peace, sadness, dignity, solemnity, tenderness, longing, boredom and disgust. However, both sets can be negatively or positively 'valenced' (numerically calibrated according to an agreed scale). Then, a clear pulse, as opposed to a less well defined one, could be associated comparatively with increased activity. Conversely, a less well defined pulse could be associated with pleasantness. Note density can act similarly, the more, the higher the activation, the less, the lower the activation. Madison and Paulin (2010 in Gabrielsson, 2016) analyse the combination of tempo and note density, which can result in ambiguity.

The relationships between keys and features starts off obviously, but can then become anomalous, as follows.

<u>The mode, or key</u>

Major: happiness, joy, gracefulness, serenity and solemnity.

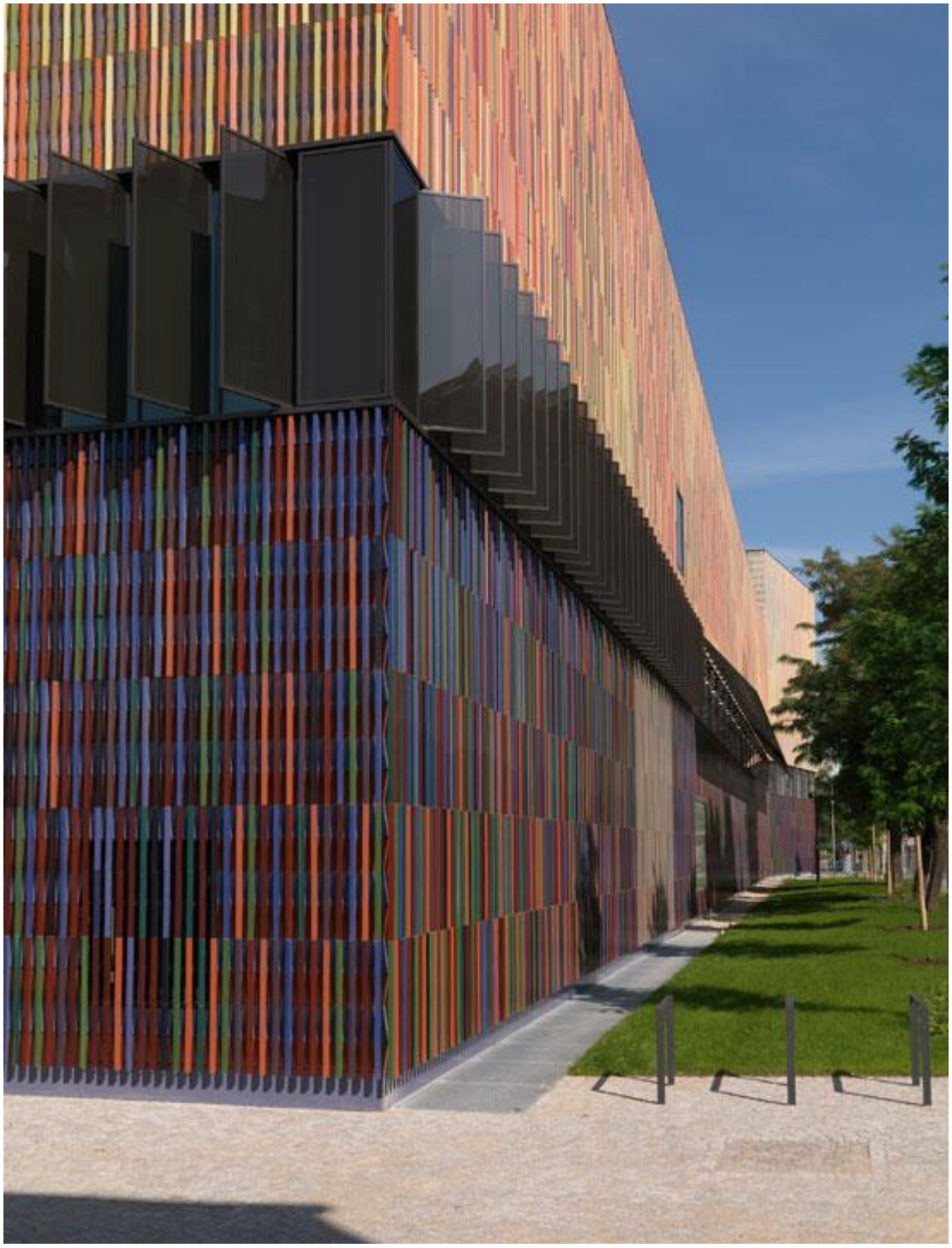
Minor: sadness, dreaminess, dignity, tension, disgust and anger.

Tempo differences: activation differences.
Mode differences: positive or negative valences.
Anomalies: Major can be sad, as in Bach's *Badinerie* 2nd Suite for Orchestra, where the pitch height and direction may be more important than the actual mode (Gabrielsson, 2016).
Minor plus a fast speed can result in a happy feeling.
According to Temperley and Tan (2013 in Gabrielsson, 2016),
Scales and modes can happiness descending in the order of Ionian, Mixolydian, Lydian, Dorian, Aeolian (minor mode) and Phrygian. It must be stated that Powell and Dibben (2005 in Gabrielsson, 2016) found no empirical evidence for equating keys with moods.
Many of the outcomes of the structural factors are as to be expected, such as for:
Loudness: intensity is equatable with power, excitement, tension, anger and joy.
So, picking out a few samples, a decrescendo: less activation and possible submissiveness, rapid changes: playfulness, pleading or fear.
Timbre and spectral sounds: high harmonics: potency, anger, disgust, fear, activity and surprise. Low harmonics are associated with pleasantness, boredom, happiness and sadness. Further analysis is carried out for short energetic sounds and with positive valency. It does not matter here to go through them all precisely. It is simply worth knowing about the effects and combinations, some of which can be surprising in outcome.
The other structural factors that are similarly analysed are, some as already mentioned, pitch, intervals, melody, harmony, tonality, rhythm, articulation, pauses and form. The latter can provide some interesting mixed results, such as:
Form: high complexity (melodic, harmonic and rhythmic, such as, say, of Gerald Barry): tension, and sadness.
Low complexity: joy and peace.
High complexity and low dynamics: melancholy and depression.
Low complexity and average dynamics: positive emotions.
Repetition, condensation, sequential development, pauses: increased tension.
Disruption of global form: probably little or no effect upon unknowing listeners. (Gabrielsson, 2016).
In summary, of the expressive function of structural factors, the most distinctive variables for human audition are: loudness, timbre and pitch, coupled with motion which is tempo or speed. Coutinho and Cangelosi (2011 in Gabrielsson, 2016) claim

there are six predictors of perceived and 'induced' emotion: loudness, pitch level, pitch contour, tempo, texture and sharpness.
Other interesting and relevant points are to do with whether the music is relational, absolute, programmatic, to do with identity, gender issues, motion, then more generalised discussions around Adorno, societies tensions, Schopenhauer and Nietzsche's views on music, Lomax's (1968) studies on folk music and culture.
To end this section, it is as it were like mixing colours on a palette: some surprising results can be obtained by mixing the factors, for instance my recipe for a positive outcome could be to mix high sound level with pitch height and an ascending melody.

Now returning to Jencks, and abbreviating through further vivid examples of the connection between architecture and music, until we come to some actual methodologies that could prove useful for this project of music making.

Jencks demonstrates architectures' obsession with the visual, the painterly, by mentioning Op Art, Seurat and the Pointillists (remembering a straightforward parallel with music here, of which Stockhausen is an example) and pixilated optical illusion. In this connection, he cites Sauerbruch's Hutton Museum in Munich. In the process he has a side swipe at the digital age's smoothing out which endorses the comment made above to do with CAD. But, the array of colours, eight, plus a second folded skin metal plate layer in two colours, as Choi Leeji says in *Designboom* (2009), possibly worked out with the aid of a computer (as I think), and as Jencks points out, is 'a literal version of musical chromaticism, a blending of overtones'. As an art gallery the spaces, including thought of daylight, have been subtly worked out to gradate throughout to suit the various exhibitions. Daylight is often worked out as 'daylight factors' and can no doubt be designed parametrically on a computer, but one feels that here the 'feeling' is for light as needed for artistic display, so the hand-drawn, or manually designed, as Eisenman holds out for, is still alive, and it shows. In fact the *Dezeen* magazine's information is more informative. They say there are twenty three different colours and attest to the careful working out of the lighting by Arup Lighting, London. The rest includes semi-sustainable heating, ventilation and air conditioning and a conservator's approach for the internal environment.



© *noshe image courtesy brandhorst museum*

Brandhorst Museum, Munich, Germany, Sauerbruch Hutton, 2009

The picture shown of the Brandhorst Museum is taken from *Designboom* instead of from the Jencks source or the more informative *Dezeen* (Etherington, 2009). The colours could be treated in a similar manner to Bridget Riley's art. Jencks is right in

that there are musical parallels here, definitely. This may be a contender for the final weighing up. The description in *Dezeen* of the different effects of far-away and close-up views and from an angle sound like a suitable scenario for something that can be transposed into music somehow: selecting a wall section as the raw score, assigning numerical values to a chromatic colour chart for pitch, matching wall colours, obtaining note values from the frequency of occurrence, tempo from the 'heat' of the colours, timbre from the material texture and light reflection, breaks or rests from the interruptions, layers from the angles and so on.

The next point that Jencks makes is what he calls the 'positive figural void'. Already we have had some discussion of void, nothingness, emptiness, holes, in regard to Eisenman and Libeskind. Here Jencks advocates Wolf Prix's Coop Himmelb(l)au's BMW headquarters in Munich, Germany, because of the technical hole in the centre of the cleverly designed double-skin twisting cone. For me, this does not work. It does not speak as music. The 'hole' analogy is too clever. The project is admirable, even superlative in many ways, technically brilliant, meeting the brief and beating 274 other architects (Coop Himmelb(l)au, 2001-2007) to win the contract, but, it is too sleek, too industrial, too materialistic, too capitalistic—*austria-architects* describe the many structures listed as 'walk-through sculptures in an urban landscape that is overarched by the virtually free-floating roof that originated out of the Double Cone and further differentiates the space into various sub-areas.' As compared to the hotel in Las Vegas at the beginning, that somehow seems more morally correct, than this uber efficient money-making machine of a building, yet claimed as almost a 'public' building for the people. There are spaces adaptable and acoustically designed to become isolated performance spaces. It should tick all the boxes. There is, of course, obligatory sustainability built in. Apart from any socio-politico concerns, as architecture this is impressive. If one had taught student who came up with a scheme like this they would have walked away with the prizes, but as music, for me, it does not resonate. This is an important lesson: that one must have empathy for a building by whatever means of translation is going to be used.

To let Jencks have his say about this building, before moving on, he describes the architecture as 'a showroom amplified into a frozen swoosh of polished gun-metal' and musically' the double cone [at the intersection of the high-speed roadways] announces the main theme like a Beethoven flourish. But it is then modulated in a horizontal direction very effectively, to slide up and down with the flat line above.'. The 'flat line' being to flat roof . Is it possible to read too much into buildings like

this? The same could be said for any semiotic interpretation. If one takes Barthes never ending series of signified and signifier, then the implication is that by definition the thing signified or denoted is going to become part of an ever increasing chain of signifieds and signifiers. This, in fact is an outcome of the TFT, so, to read metaphor into buildings is justified.

Having linked Frank Gehry with Jimi Hendrix and 1960s rock music, Jencks returns for one more analogy, which may just win the point: he states that Prix's sleekness with the BMW Welt 'slides around like an electric guitar', which could seem apposite, and the open spaces are inspired by amongst other things Karl Popper. Apparently, 'a large communal open space is found in all Prix's iconic architecture.', so it is not just an empty gesture, dilettante flamboyance; he seems to mean it.

By contrast, Jencks's next offering is a humble sociologically driven project. This has immediate 'kerb appeal' and immediately the musical resonance rings out. Along the way he compared minimalism in architecture and music and in his opinion music wins out because he cannot think of a poor example, except *muzak*. For him, Philip Glass and John Adams do not stoop to nagging doubts of ' conformity in architecture'. He makes a relevant point about the two Bachs, which must be J. S. and C. P. E., who made 'superior background fugues that transform mathematical patterns.'. His use of the word' background' would be in an architectural or aesthetic sense, rather than a put-down as *muzak*.

Using Jencks's image, Alan Short's low budget *School of Slavonic and Eastern European Studies* (2004-6), typically crammed into a tight space, using modest London brick and yet meeting 'numerous eco-requirements' (and seemingly in an honest way, like Alison Brooks' and Bill Dunster's famous BedZED), economically inserting extra floor levels, forms a streetscape 'giving an understated rhythmical complexity that enlivens the city block: vertical, horizontal and even diagonal patterns of movement.'. He calls this 'low-key music'. Agreed. Jencks said that the London brick was stipulated which he subtly 'articulated' for 'ecological and semantic' reasons (it would have been nice to know what these semantic reasons were: possibly something to do with the Eastern European element) and that he created 'new rhythm of exhaust stacks and doubled-walled insulation' relating to 'Slavonic traditions'. It is difficult to find music in 'double-walled insulation', but this is simply read as forming part of the overall brief—and, technically, if one applies the 'new materialism' principle (Birtwistle, 2018), there should be music found in material itself. It may be just a matter of looking and finding.

Architectural-review

School of Slavonic and Eastern European Studies, Alan Short, 2004-6

Jencks then enters a colourful discussion on symbolism and semiotics as employed both in architecture and music and seems to cavil against ‘abstraction’ in both spheres. Avoiding this discussion, which could well be entertained within the TFT and be a very pertinent subject, but it could easily fall into the ‘too long’ camp. So, moving to the next point in Jencks’s exposition, we come to perhaps one of the most relevant examples for this project, Herzog & de Meuron’s *CaixaForum*, Madrid, 2003-8.

Contrary to Jacques Herzog’s claim that “a building […] cannot be read like a book.”, Jencks claims the complete opposite and sets out to demonstrate this with one of his and Pierre de Meuron’s buildings, and musically. This example goes to the core of this research in that Jencks finds an immediate correlation between *CaixaForum* and a musical score.

Architectural-review

CaixaForum, Madrid, Herzog and de Meuron, 2003-2008

The image is copied verbatim, as it were, from Jencks's article in the *Architectural Review*, that is here being used as a leading source in support of the thesis that music can be made from architecture.

Firstly, Jencks notes the 'context' of 'surrounding buildings and an old brick electricity station'. It is noticeable that sometimes it is the case with high flying status symbol buildings that a premium parcel of land is available for the architect to work on and where it seems more about the architect's prestige than a more sociologically and sustainably conscious placement of the building, in these cases, not all (the last two cases cited here are such examples), the buildings just sit out of context, not relating to their surroundings, in relational terms of sympathetic architecture, mindfulness of local culture, how humans will relate to the buildings, also, how the buildings affects the local ecosystem, and by extension the whole world. There are planning laws, yet politics, bureaucracy and other factors affect the wholesale effective implementation of these laws and byelaws, as discussed with Andrew Clague (**Appendix A**). As regards the sustainability side of things, there is a rigorous system of investigation, assessing and reporting of the impact of building projects at

the feasibility stage, for significant developments, upon local flora and fauna and other environmental implications, such as, to do with Japanese Knotweed. or dangerous metals in the ground. This is called an Environmental Impact Assessment (EIA) and is rigorous. Much of the laws in the area of environmental issues have come from European legislation. As a chartered environmentalist (CEnv), I personally, find these laws to be an asset in protecting the environment, for instance as regards the quality of rivers for wildlife. Whether Brexit will affect these currently waits to be seen. In a full interpretation of TFT this again seems axiomatic, that things adjacent or in a locality should be taken into account for their effect, also, due to the 'ripple effect' (the pebble in a pond causation of waves that never die out, only diminish in size with distance) the far flung effects. This 'context' for *CaixaForum* Jencks considers laudable, a good start. There must surely be a musical corollary here too.

Now, for the actual musical score of the building. Jencks find the existing 'preserved' brick façade to fall into the Ab category that he discussed in terms of classical proportions earlier. This forms 'rhythm'. He considers that this rhythm is then 'taken up as harmonic chords in the top rusted iron addition', also, 'set against the vertical garden [called a 'green wall', an ecological device that adds greenery to people's lives, as a relaxing and natural colour, bringing people in touch with natural plants even in the midst of compact urban areas, whilst aiding the extraction of carbon dioxide from the air and acting in other beneficial ways such as provided natural habitat for creatures] and void at the base'. Depending upon how this vista, or collage' is 'read', it can be divided via 'strong horizontal contrasts', 'into three basic voices or four or five melodies'. These are, from the top, (1) 'rusted cast iron', (2) brick, (3) black and finally at the bottom, (4) void. 'The basic Ab rhythm unifies the volumes [it is noted here where the terminology chapter is yet to be written that this word volume is perhaps a typical example of both disciplines sharing a word with similar and yet slightly differing interpretations, and where in fact connotations can be swapped across the divide, such as volume in music could mean amplitude and volume in architecture means the three dimensional space enclosed by the elements of walls, floors and ceilings or other spatial enclosures or encompassments—as metaphors they can almost freely be interchanged] and blank windows vertically'. The vertical element is 'amplified' by the top 'volumes'. There are some grilles, not so apparent in this photograph, but visible in *Dezeen's* excellent, as usual, coverage (Etherington, 2008, at the top restaurant level, again explained in *Dezeen* and in the tourist

information, *CaixaForum*, 2018). These grilles, Jencks calls' mashrabiya grills', which he claims is a Moorish reference. Azra Akšamija (2013) endorses this view and elaborates upon the original Islamic mesh type screen which has gained cross-cultural semiotic references and meaning as part of a constantly changing and evolving world. Musically, Jencks thinks that these grilles are, collectively, here, 'a cadenza culminating each chord', providing a 'background buzz', the equivalent of a 'drone'. Regarding the vertical garden, he could perhaps have made more. He simply states that it is by someone called Patrick Blanc and that there are upward and diagonal stresses. It is also arranged to be an innovative art form in its own right. From a personal perspective, looking for aids to illuminate the architectural-musical connection that can be interpreted musically, this perhaps misses a trick. The fact that the wall is at an angle different to the main wall, in a different plane, could have possibilities for some other sound perspective occurring at the same time as the main music going on and the 'art form' aspect of the design could on its own be a source of inspiration, like a Bridget Riley painting. This can be bone in mind for later when composing as a possibility for consideration. In fact there is so much going on that it could be bewildering, as some of the commentators on *Dezeen*'s (2008) webpage show. This may well have been true even for Herzog and de Meuron as their comments indicate from the same source. They started by stripping out the existing building before deciding what to do with it. The undercroft or void then appeared and became then a prominent feature where the rest of the building seems to float on top of nowhere. This seems to emphasis a growing theme, that of void or nothing. In music this could be silence. Jencks singles out Herzog's "visceral impact" of 'primitive themes' of 'contrasting blocks of colour and material', likening this to Stravinskian gestures.

A schematic of the musical translation of CaixaForum is shown below. It accurately shows the mode of translation with its elements. The adjacent green wall is taken to be in the same plane as the other musical elements [another shared word to go into the word list, element]. In footnotes (15 &16) to the unillustrated academic version of this same article Jencks points out that the harmony can include dissonance. This schematic can be taken as a template or paradigm, a methodology that can be used as part of the portfolio of means to create music from architecture.

Architectural-review

CaixaForum, Madrid, Herzog and de Meuron, 2003-2008
Musical translation schematic, Charles Jencks and Megan Burke

The fact that the element of windows could become a musical element when translated, is something intended in the first composition *Unknown Building in Four Parts: Part one* (**Appendix C**).

Jencks then likens Eduard François's *Fouquet's Barrière Hotel* in Paris, France to *CaixaForum*, except in grey monochrome rather than chromatic colour. There are similarities, including issues to do with windows, but Mark (2007) gives a real inside story that is relevant here, a post-modern story.

The reason that it is grey is to do with the client brief, a response to French conservation rulings, a post-modern statement by the architect, referring back to an

architectural period of a bygone age, ‘neo-Haussmann style façades’ mimicking the Champs Elysées, yet with modern twists, statements about modern requirements of windows breaking with the façade (destroying the ‘classical symmetry’, something that Greg Lynn would approve), flattening features of ‘carved reliefs, lion’s heads and columns’, which Mark says is ‘reminiscent of the Reichstag wrapped by Christo’ looking ‘more like art’ than architecture, and a disconnect between exterior and interior of buildings.

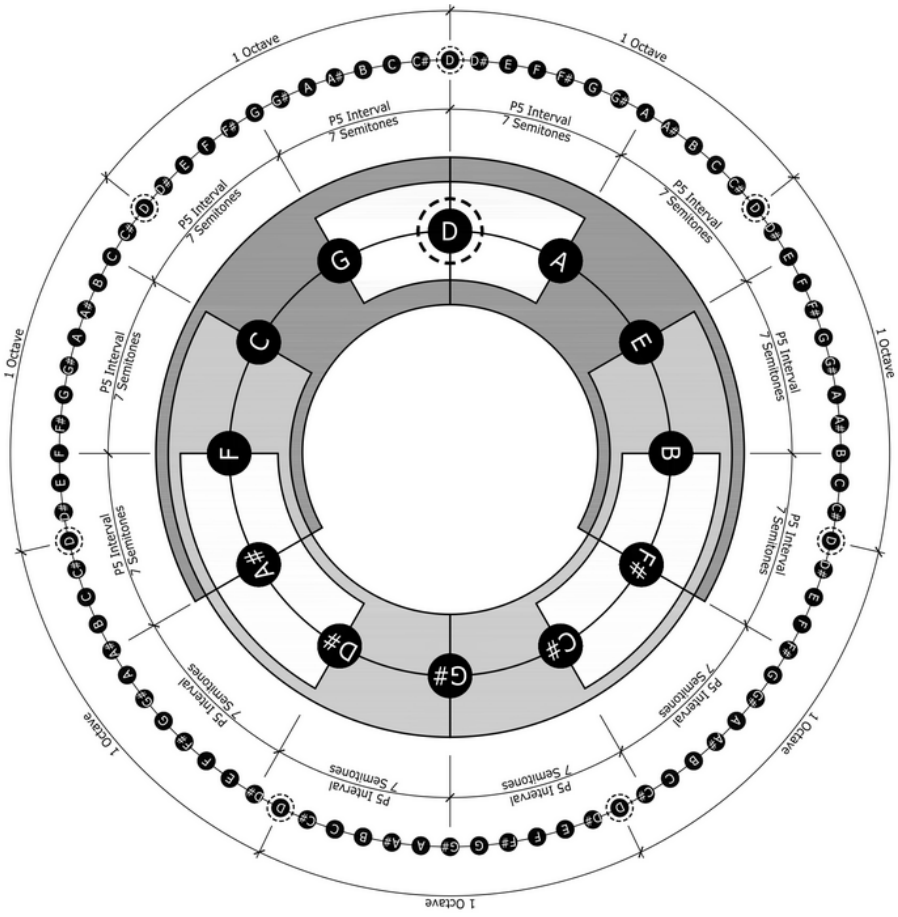
François cast the pastiched new façade in grey concrete by a system he invented and patented, altering the depth of reveals to create a strange overall effect, where all looks like concrete, even the doors and mirror-glassed windows. It was a solution to problems set, whilst at the same time doing what post-modernists do in saying that they will do as they please, including refer to history and then adding completely new perspectives to transmute the historical references into a fresh art form. The same is true of music. A piece that I have written for a CoMA trio perhaps to be tried out on a course 2nd to 6th January 2019, entitled *Yarns* (**Appendix D**) I described to someone as ‘on a cusp of falling into a chasm of dissonance and modernistic music with a retention of tonality . The old styles of architecture will suit say a Baroque or Romantic approach, but then we are in the modern age.’. I justified its consideration in connection with architecture as of three coloured yarns, thus to the extent that synaesthesia has anything to do with architecture then this might do as well.

A detail, close-up view, of François’ building is shown as follows, quite unsettling, but that is what modernism and its later cousin postmodernism can do.

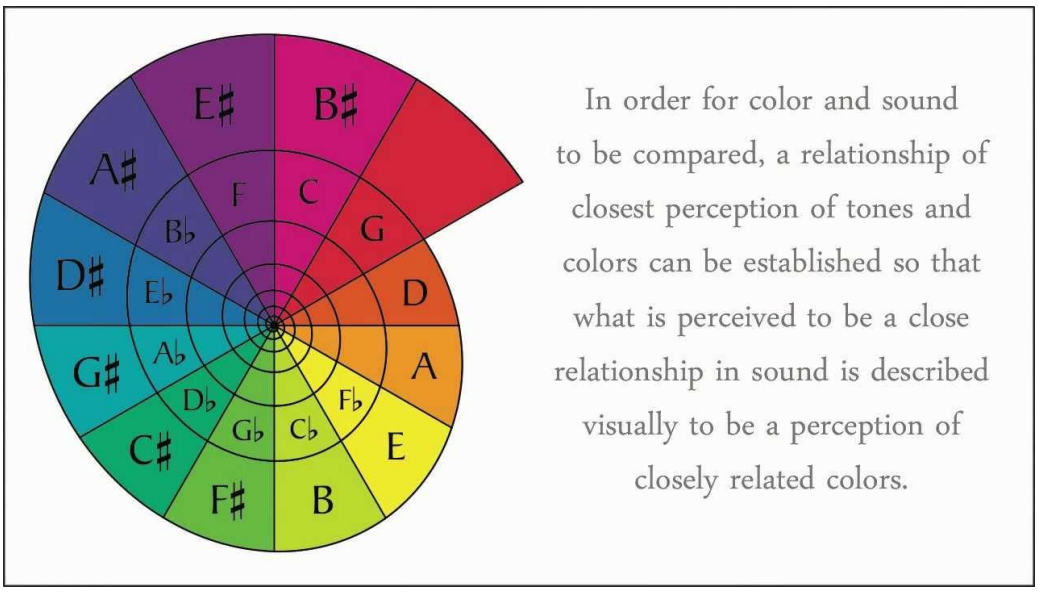
Paul Raftery

Fouquet's Barrière Hotel, Eduard François, Paris, 2004-6

Next, Jencks jumps to the Circle of Fifths. He uses the illustration from The Architecture of Colour Music, as below.



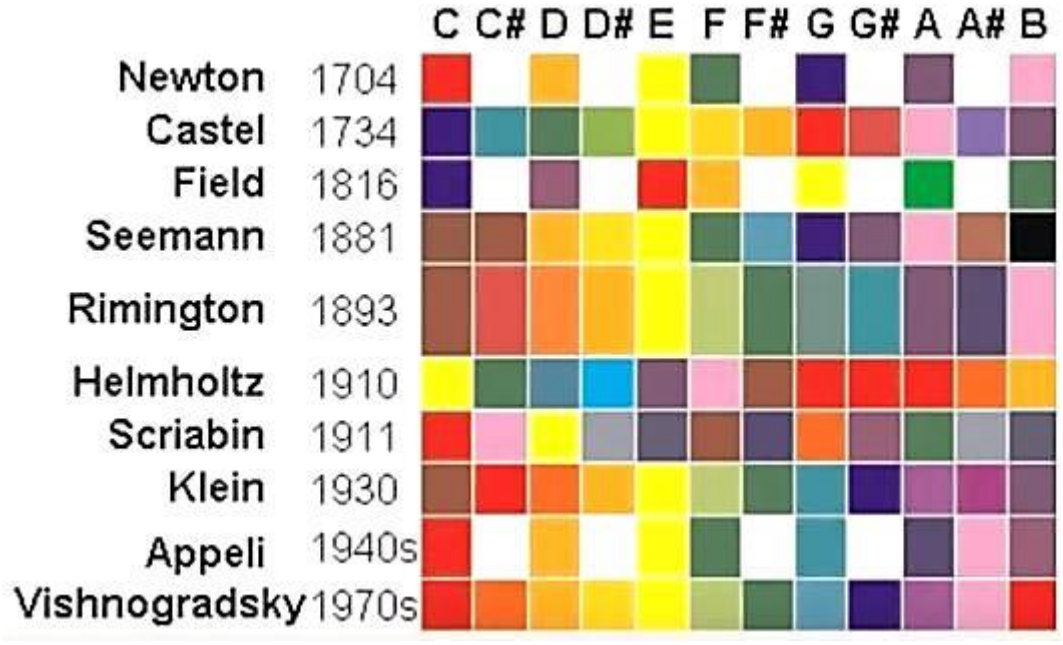
Circle of Fifths, Architecture of Music, Charles Jencks



Colour Wheel Music Theory

Alternative Circle of Fifths, from Video, 2013, and related book, Mark and Michael Sandborn and Nataliya Vatsyayana, 2014 ‘A Rosetta Stone: The Universal Harmonic Language Model’

Jencks in a footnote (20) to the academic version states that chromatic colours can be obtained, calling such a scale a ‘metaphor’ like the geometric one. Both Mark (2013) and Michael Sandborn together with Nataliya Vatsyayana (2014) believe that they have arrived at a definitive colour system based upon analysis of harmonics operating in fields arriving at the Circle of Fifths as shown above in the spiral, as their patented system Virtuoso 3.0. They claim that it is ‘scientific’ as opposed to previous systems employed by Newton, Helmholtz, Scriabin and Kandinsky and others (Sandborn, 2013). They show a colour chart, as below, of various previous permutations which they believe is not accurate, in fact arbitrary, as is synaesthesia, which is arbitrary in the sense that brain chemicals are possibly involved in selecting colours. In the Weberian sense (Sandborn and Vatsyayana, 2014) this is as valid as ascribing real numbers to perception in the ratio of 1:1, that is that whatever one believes to be the case is the case. This may help with the synaesthesia interest as shown in this research.



Having previously become interested in colour and pitch or frequency notation I used the following table for ascribing pitches to notes for a composition for

viola, played in fact by Martin Outram of the Maggini quartet on 10th March 2018 in the Saint Gregory Centre at Canterbury Christchurch University

Note	**Hertz** LucyTuned	Equivalent **Wavelength** Angstroms/10 Nanometres	Approximate **Colour**
A	440	619.69	Orange-Yellow
A#	457.75	595.66	Yellow-Orange
Bb	472.27	577.34	Yellow
B	491.32	554.95	Yellow-Green
Cb	506.91	537.89	Green-Yellow
B#	511.13	533.44	Green
C	527.35	517.03	Green
C#	548.62	496.99	Green-Blue
Db	566.03	481.70	Blue-Green
D	588.86	463.03	Blue
D#	612.61	445.08	Blue-Violet
Eb	632.05	431.39	Violet-Blue
E	657.54	414.67	Violet
Fb	678.41	401.91	Ultra Violet
E#	**684.06**	**398.59**	**Invisible Violet**
F	**705.77**	**772.66**	**Invisible Red**
F#	734.23	742.71	Infra Red
Gb	757.53	719.86	Red
G	788.08	691.96	Red-Orange
G#	819.87	665.13	Orange-Red
Ab	845.89	644.67	Orange

harmonics.com

Lucy Scale from *Pitch, Pi, and Other Musical Paradoxes*, Charles E, Lucy © 1986-2000

The above was what I considered at the time to be the most attributable in a scientific way to actual colour representation of sound, given many variables and attempts to systematise this by not only as described by Sandborn and Vatsyayana, but also, Berlioz, Debussy, Wagner, the Rosicrucian Order, Charles Fourier and Guy Murchie (Charles Lucy, 1986-2000). However, Sandborn and Vatsyayana make a compelling case for their theory where they link colours to a rigorous analysis of harmonic

relationships and then a rational approach of marrying up both musical and sound harmonic series. It does not mean that people will necessarily agree subjectively with their ascriptions, but they come the closest to obtaining an empirically based ascription.

As regards chromaticism, they see this as an aberration, although one that can gain pleasing effects and be useful in art. An idea throughout this process, from the artist's angle, a musically artistic angle, is to possibly deliberately chose to compose in a conventional (or semi conventional) vein, whilst at the same time, writing in a parallel mode chromatically. This could create an interesting tension between the 'correct' ascription according to Sandborn and Vatsyayana and a deliberate mirror sound image as obtained chromatically or simply to subvert the ordinary reality of sound to essentially see what might happen. The juxtaposition of the two might illuminate the ordinary reality of Sandborn and Vatsyayana and or the other way around might happen; the chromatic element may become dominant and be illuminated by the ordinary, or, to put this simply, there may be an interesting outcome in the conversation between the two. To borrow from Charles Jencks and to perhaps use the *CaixaForum* idea, along with the 'green wall' at right angles, or some oblique angle, and then taking Sandborn and Vatsyayana's point coupled with Weber's, that essentially any other system than theirs is subjectively arbitrary, along with synaesthesia (about which subjects may have little choice since it is likely just a brain disposition), then choose which colours I like to ascribe some notation to represent some element of architecture, including even if I display any element of synaesthesia. To take the synaesthesia point a bit further, it might be interesting to deliberately explore a synaesthesic element of a composition.

The rest of Jencks's exploration is concerned with extracting musical references from Le Corbusier's *La Tourette, France*, 1953-61, more on Coop Himmelb(l)au whom Jencks obviously admires, including an opera house in China, also the Frank Gehry Disney Concert Hall of Los Angeles, 1998-2003. However, I intend to deal separately with concert halls and the like, so these can be left aside for the time being.

To end the Jencks exposition, it seems fitting to quote what Jencks has to say in brief about one of the most influential architects ever, le Corbusier and his *La Tourette*.

In footnotes 21 and 22 he says this:

Pure volumes in proportion to each other and dissonant; regular harmonies and rhythms set against atonal and serial window verticals designed by Xenakis; Classical squares, cubes, pyramids juxtaposed with discordant slashes and diagonals.

There is something about the purity of Le Corbusier that can be an inspiration for architects and composers alike, including Xenakis.

Some conclusions

From the research so far, there are various stand-out points emerging:

1. This seems to be all about people, a series of, if not biographies, then accounts of ideas in relation to people, as coloured by their personalities, their world views, their theories, their positions in the universe of history and culture.
2. Sociology has definitely emerged as a trait common to both architecture and music—and politics. Two leading sociologists in this respect are Bugni and Smith and a stand-out political spokesperson in the Marxist vein is Mathias Spahlinger.
3. Connected with the last point, the constellations of both architecture and music are wider in encompassment than limited starting definitions of the design of buildings and making music. And these constellations overlap. As Bill Dunster found with BedZED, when he made the first step to widen architecture, through including sustainability associated with buildings, thus widening the definition, to include electric cars outside in the parking lot provided for the building occupants to use. So, sustainability widens architecture. It is also a modern scope conceptual phenomenon. As Einsteinian relativity and quantum physics are to Newtonian physics, the more we look into what constitutes the two disciplines of architecture and music, the more the concepts widen, the more they contain, denote, connote and then with the application of semiotics, the more that is then brought in by the endless series that are produced. Architecture can include art, things in buildings and associated with buildings, even principles of management and moral issues, By association, the same can be said for music.
4. Various means of writing and producing music have emerged, not necessarily always successfully, from the first attempt *Unknown Building in Four Parts: Part One*, but in innovative ways.

a) There is the visceral, host form the heart, modernistic approach of Katrina Burton. Concomitant with this is to consider writing relatively simply and or sparsely and for one, two or a few instruments and to marry these up timbrally with the materials of buildings.

b) There is the Milton Mermikides (2018) model of translating data derived from architectural elements and transcribing those, perhaps, electronically, to make music.

c) There is a wealth of ideas from the extensive study of Charles Jencks's article in the *Architectural Review* in both magazine form with illustration and as an academic publication without illustrations yet with footnotes. A stand-out model from him is the way that buildings can be broken down to parts or elements and assigned to musical equivalents to read almost like a stave, as with *CaixaForum*, along with reading the semiotic meaning inherent in the architect's intentions, their musical metaphors and their epithets of aesthetic *poiesis*.

Along the way we encountered several people that Charles Jencks introduced us to, who have stimulated musical interpretive and experimental methods. Greg Lynn suggested 'breaking symmetry' and Sandborn and Vatsyayana have suggested a colouristic interpretation, perhaps ascribing note values to colours in buildings and art, such as of Bridget Riley, even considering contrasting with chromatically coloured note values as well.

5. With an open mind and from visits on holiday with my wife, I have unwittingly stumbled upon cathedrals and churches that speak to me musically and if one element in particular is singled out, that would be stained glass. Where the intention is to produce a spread of musical offerings, via a variety of means of composition and of various styles and time periods, it now seems an imperative to produce something in some sort of 'churchy' mode, perhaps like Hildegaard of Bingen, or Tavener, as seemed to be a favourite of Andrew Clague and or a combination of my own ideas together with further specific study of the area. Some particular personal favourite composers in this idiom are Giovanni and Andrea Gabrieli, Tomás Louis de Victoria, William Byrd, Thomas Tallis and Arvo Pärt. From the visit to Norwich cathedral two pieces were suggested by the architecture there, an organ piece and a simple choral piece. The organ piece that I heard in my head at the time was for a church organ in a Bach or Buxtehude or Sweelinck or someone in that sort of vein,

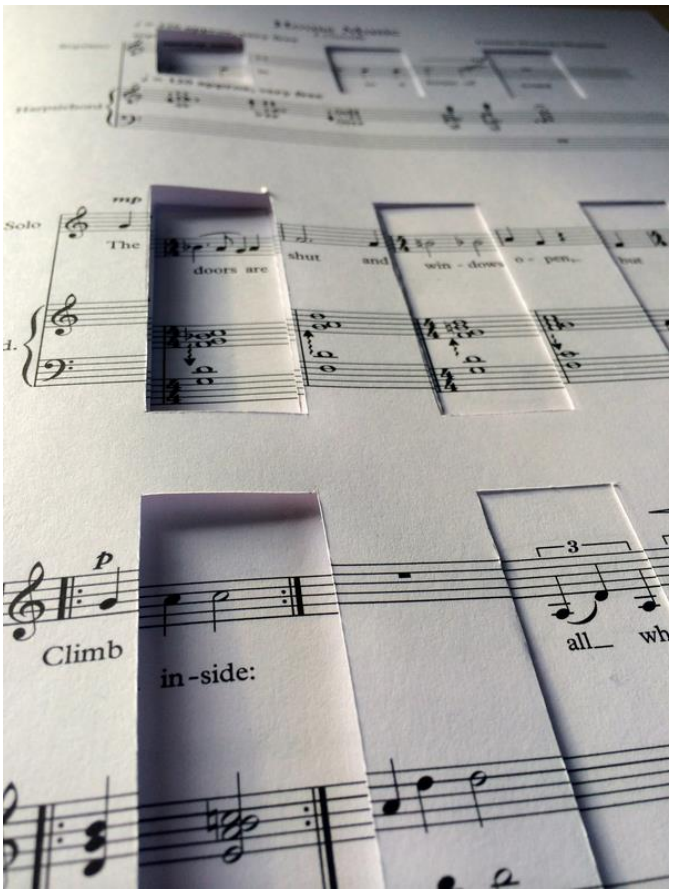
Renaissance or Baroque. Also, it has been an intention to write for Lauren Redhead, organist and composer and Alistair Zaldua, electronic sound artist, violinist and composer, using such methodology as Pure Data open source programme like MAX/MSP together with an appropriate score such as a graphic score. This will require further familiarisation with the software. Although I have had ideas for sources of inspiration for pieces for them, for this project it will be required to keep the sources strictly in relation to architecture. This may involve a mixture of methods as already described, together with what I term 'direct' translation that is described by the Total Field Theory (TFT).

Musicians and architecture—some case studies

Cevanne Horrocks-Hopayian

Cevanne Horrocks-Hopayian has been mentioned a few times already. Whilst she naturally is involved in other projects and in fact other sorts of music, such as jazz, orchestral, choral, gamelan, found sounds, wearable technology and collaborations of various sorts (Stone, 2018), this study is primarily interested in her two-year LSO (patron Susie Thompson) residency at the National Trust's 575 Wandsworth Road, Khadambi House (2012-2014), about which she explained and produced examples of her music at a conference at Canterbury Christchurch University on 24th May 2018. As the website (British Music Collection) says, she is 'Anglo-Armenian, and born in Suffolk'. 'She grounds her work in the British isles – digging into their rich soil to find artefacts which we would not always imagine to be native.' It is these perhaps unusual objects which provide an almost disarming simplicity and charm, perhaps showing a meld of her Armenian roots and adopted Englishness. She explained at the conference that she soaked herself in the spirit and atmosphere of the place, walking about and gaining connection over time. She came to appreciate the idiosyncratic timber panelling and exotic ornamentation that Khadambi Asalache had made his personal stamp upon the, at first ordinary house, turning it into an oriental treasure trove, an example of his skilled craftsmanship. So it could be an ornamentation of birds, a particular room, or even an inkwell, that was the source of her music. Indeed one of her pieces was about an inkwell. The music, from memory, involved about four players, one a singer, in fact her sister, with a rich creamy other worldly voice, the music simple, melodic, yet of a strange fascination. Does she perhaps use

Armenian scales or at least flavour? Having met her, a quality that comes across strongly is a quiet sense of belief in herself and naturalness. A notable feature of her music is what she calls ‘eye music’. An example is shown below.



British Music Collection

eye-music score ‘House Music’ for soprano and harpsichord, commissioned by Handel and Hendrix in London

The above clearly shows word painting taken to the next level, 3D. As the British Music Collection call, ‘tactile’. She even decorates her music as part of the score with hearts or birds which are to be read and played. Her work *The Swallow* (2017), is onomatopoeic, full of trills of voice and instruments in a close range, yet is has a vibrancy. Her music is more tonal than that of Katrina Burton, yet there is a lesson is to be learned from both: to not overdo it, to relax and let the music just flow in simplicity. I would like to say that this is in accord with the TFT, but in a way that is still overdoing it. It needs more Zen Buddhism, more letting go and being uninhibitedly natural. A result of academic theorising, which is something that Korsyn (2003) might have been getting at, is that it can stifle creativity, one can try

too hard, although Korsyn was probably getting more at the academic 'system' from another angle, of over regularising, in the end creating mediocrity. I will try this 'natural' approach with the trio at CoMA in the early new year in Oxford.
Additionally, Cevanne Horrocks-Hopayian was nominated for a British Composers Award 2018. She did not win, but to be nominated out of in excess of 560 entrants, with winners as Judith Wier, Trevor Wishart, Sally Beamish and Harrison Birtwistle (Parr, 2018), is an accolade. The work for this *Two Machines* performed with Hugh Jones showed a different side of her musical persona, was a piece of great fun, sounding a bit like Robert Wyatt's Soft machine and sophisticated rap, using harp, which she no doubt played, being a harpist, and 'local field recordings', electronics and 'DIY instruments, such as 'Sonic Bonnet' and 'Concertronica', whatever they are (Horrocks-Hopayian, 2018). One can only guess. This puts a different complexion upon how to treat music making: natural approach, and a sense of fun, plus experimentation with different fields, including electronic music.

Katrina Burton

In the vein of the multi talents of Cevanne Horrocks-Hopayian, it was noted that Katrina Burton composed in a different way as well. Whilst still in a serious mood she showed that she could compose to a structure of a sort. Whilst the *Carr Chapel* was all about getting into the spirit of place, materials and the intention of the architect Mies van der Rohe, she showed that she could extract musical data from building and represent music as lines taken from architecture, something that Milton Mermikides does. He took the outline of the Canterbury Christchurch University chapel (Mermikides, 2018) and turned that into a melody, where he said that he was impressed by what Villa Lobos had done for the skyline of New York (Mermikides, 2014; Jardim, 2011).
Katrina Burton described in a talk at Edinburgh Napier University (2017) how she applied some of these different techniques. First, she described how she can be influenced by art, that is, sculpture, painting and photography. There is a tactile element to her music. The Carr Chapel cello piece was all about getting into the material of the Travertine marble, the terrazzo, the brickwork and the actual steel of the cross. She explained how she reacted to a sculptural piece by Fred Sandback at the Fruit Market in Edinburgh, which consisted of strings like rods hanging from the ceiling in the gallery down to the floor. She described her reaction that she wanted to

touch them and play them as an instrument. As a consequence she wrote a cello piece inspired by this experience.

The cello seems to feature highly with her. This is understandable, since the resonance of the strings can be most expressive. Where there can be a dichotomy of electronic instrument versus analogic real instrument, the stringed instruments can be appealing. The action of a real breathing human operating a wooden bow with horsehair and rosin across a gut string, or synthetic counterpart, and where the sound echoes in the belly of the wooden instrument, picking up mellow tones from the wood itself, is difficult to replicate electronically. Matt Lewis, the sound artist interviewed on 10th December (**Appendix B**) disagrees. He considers that one can express oneself just as well if not better with electronic sounds, making the point that most sounds or music are mediated electronically one way or the other and that one can have a fine control, micro managing the sounds, by for instance, time stretching to create just the sound that one wants. Trevor Wishart, the renowned experimenter with a mix of analogue voice and various means of electronic morphing, even of creating new sounds (Di Nunzio, 2013) would most likely agree with Lewis. I too have written several pieces for solo cello; in fact love the cello sound, especially in its top register. Perhaps the five day CoMA course in Oxford starting on 2nd January 2019 in the Jacqueline du Pré building (Kelly, 1999), the combination of Burton's and Du Pré's influence, together with there being a cellist as part of a trio, might elicit a cello piece.

Next she described only her influence to write inspired by art photographs of Stephen Lawson using long exposures together with a panoramic panning technique. Perhaps the dual elements could lend themselves to, say, long notes on a cello, with either other higher more intermittent notes on the same or a different instrument.

The next composition described is in conjunction with funding to go to New York, America, where (paraphrasing and using many of her words) she wrote a piece based upon setting off, with permission, a white noise pulse in the lobby of the Chrysler building, then recording the reverberation, thereby capturing the principal pitch resonances of the building, which she used in conjunction with profiles and surfaces of distorted photographs of the Chrysler building reflected in nearby buildings to determine melodic lines and textures (Burton, 2017). She makes the point, that while this was composed, as it were, *for* the building, it was not played *in* the building, and therefore was not 'site specific' as the Carr Chapel piece was going to be, also, another piece prior to that, for Madlener House (built in 1902, originally residential then latterly home to an arts organisation), for violin and cello. In this last

piece, she wrote rather in the manner of Cevanne Horrocks-Hopayian writing inspired by the decorations of the Khadambi house, where Katrina Burton's composition was informed by limestone, 'beautiful' mahogany, 'intricate staircase' and colourful patterns in a stained glass window. So this is inspired by place, architectural details and above all materials. For Burton, Madlener house was a stepping stone in understanding how music could help people understand architecture as with Carr Chapel.

Then came the piece, which could be most closely aligned to Milton Mermikides' manner of compositions, using lines from architecture. The Craigsbank church near Edinburgh, designed by Kininmonth and as inspired by Le Corbusier. For this piece, Burton took two lines, a diagonal and a horizontal and had a long glissando on the G string played against a long held note on the adjacent string and bottom C of the cello. Then she played with various textures, harmonics, tremolandos, trills and repeated notes to represent various features of the church that appealed to her, including the juxtaposition of solid mass against ethereal white paint, floating ceiling and daylight and the bell tower beams and shadows. Having researched the Craigsbank church from the architectural point of view (Craigsbank Parish Church; Historic Environment Scotland; LDN Architects, 2018), in a similar way to that of Carr Chapel (**Appendix E**), a point became apparent, which is probably quite important from the translational point of view of buildings to music, and that is: where Katrina Burton singles out some architectural feature that interests her and then by various means as is being outlined in this report she relates the aesthetic and some knowledge of the building, style, architecture to an emotive response. It is this emotive angle that comes across as most effective. It seems that a thorough knowledge an understanding of the architectural principles involved is not necessary and could, in fact, be detrimental to making and effective musical response. The technical knowledge could impair a creative response, as it were sort of killing it with a burden of dead or dry information. Possibly a purely mathematical and algorithmic approach could work under these circumstances, but then with the advent of increasing computer sophistication, it is not impossible to imagine a scanner, such as a Leica photogrammetric surveying scanner, admittedly costing probably over a £1 million pounds sterling, and coupling this with various computer programs, that a master program could do all the work to make a composition from all the parameters it considers necessary and come out with a composition, thereby rendering a human composer redundant. This involves current debates about AI, the evolution of

computers and sophisticated arguments about control of computers and computer rights.

A conclusion here is that it may be preferable for the so-called imperfect human with partial knowledge to be in control of musical composition. A very interesting topic for further investigation at some time.

Peter Adjaye

Peter Adjaye is a gift to the cause of making music out of architecture, because he has gotten a name for doing just that for some time, quite often in collaboration with his brother, renowned architect, David (Wainwright, 2016). In the Evelyn Glennie BBC programme on Radio 4 (2018), *The Rhythm of Life, The World as an Orchestra*, Evelyn and Peter talked in the same terms as Charles Jencks has done, agreeing on buildings being broken up into elements and sub-elements, of different character, which can all bespeak musical connotations of layers, rhythm and other musical parameters. Light creates different feels or timbres. In short, they agreed that buildings can be read expressively and literally as musical scores.

In a joint BBC Radio 4 (2016) interview with John Wilson in *Front Row*, Peter and his brother David discussed various collaborative projects. Peter admitted to working with an 'immediate' musical response when walking around his brother's buildings, responding to an emotional 'human centred' narrative content, such as with the Stephen Laurence Centre in Deptford, London, or a sense of community as with libraries, or the Oslo Peace Centre where after a while Peter's music became embedded in the story of Nobel laureates and a constantly changing backdrop of technological noise, and partly countering this noise. Peter said that geographical space was important for him. He gave an example of the Stephen Laurence Centre where he literally started outside and walked through the building, the score mimicking his location. At one point he could arrive at an etched window designed by Chris Ofili casting shadows, where he could interpret this percussively, with ride cymbal and wood block sounds representing glass and framework.

This 'immediate' reaction is akin to Katrina Burton's evocation of materials, yet slightly differently. In answer to a question from John Wilson, Peter's is empathy for the architectural 'form' of the building as musical 'form', whereas Katrina's is an attempt to get into the 'inherent' qualities of the materials (Burton, 2017).

Where Katrina Burton may use a cello expressively, so may Peter Adjaye, but, under his pseudonym, or AKA name, DJ Kwame, he tends more to create an

electronic sound with beats, possibly using synthesised instruments as well, which Oliver Wainwright, in an interview (2016), again with both brothers, described variously as ‘ambient’, ‘jazzy’, ‘meditative’, ‘brooding’, or ‘spine tingling’. As with Milton Mermikides, Peter sees music all around, “rhythm and melodies in everything that surrounds us” (Wainwright, 2016). He goes on to say “Music is how we navigate the city. Every space has its own soundtrack”. Matt Lewis, the sound artist would agree, except that he sees it more from a sound analytic idea as vibrations everywhere, in all materials, people, in everything (**Appendix E** and immediately following).

Peter expressly links with architecture, having completed a degree in engineering and a PhD in mathematics, where he studied the ‘golden ratio’ or golden mean. So he would be able to relate to and interpret structural elements of a building without having to consider translating these into everyday language before transcribing them musically. When John Wilson (2016) asked David Adjaye if he thought architecture was ‘frozen music’, David demurred and agreed that it was to do with ratios and proportions, which is obviously something shared with his brother Peter, here a concurrence of music and architecture.

Matt Lewis

From an interview conducted on 10th December 2018 in a café in Margate, near the Turner Contemporary gallery, sound artist Matt Lewis, a lecturer at the RCA (Royal College of Art), gave his ideas on what music is and how it can be made in relation to interpreting buildings. His view of buildings is all inclusive of their usage in context, their surroundings, community and cultural issues. We discussed music from a removed perspective where aliens might consider that we humans congregate and make vibrations (meaning that we need human senses and a brain to interpret these vibrations) and that sound may well have been around in the universe before the lights came on after about 300 million years (assuming the Big Bang model), indeed that there may be some credence to the Vedic Om as a progenitor of the universe. For him sound, which is music, and yet not necessarily the same for everyone, requires no medium of translation. It is a matter of getting straight to the sound source. For him, music is ‘political’ and should always be concerned with sociological issues. Traffic is music and since the days of the internal combustion engine are likely to be numbered and replaced by electric cars, there is an element of creating archives of this sound. He stated that electric cars would not necessarily mean silence, that tyres on roads make a noise. When I asked about the environment he showed a natural concern

for found sounds and ecology, but stated quite plainly that ‘nature’ per se was not the idyll as many thought, that the reality of it was cruel. We agreed the universe is in a constant state of flux, everything is moving and that humans are at the top of the evolutionary tree with responsibility to create solutions. This idea of motion extended naturally to materials, which he thought could be considered in the light of ‘new materialism’ of the likes of Petra Lange Berndt (Birtwistle, 2018), where previous autonomy over materials can yield to a new humility in the investigation of sounds from materials. For him this investigation seems to be the main source of making music. He considered that sound as music does not necessarily have to come from real instruments and that electronically generated sounds can be manipulated to sound anything from real to any artificial sound. This is in line with electronic exponents such as Trevor Wishart (Di Nunzio, 2013), David Jaffe (2015) and Jonathan Harvey (Jaffé, 2004), where natural sounds can morph into artificial sounds. However, Lewis might be content to remain in the artificial domain. He argued that there is little if any difference between so-called natural sounds and sounds generated electronically and that much sound id mediated by some electronic means. Lewis particularly liked the degree of control and the sound world that can be created within a sound envelope such as by time stretching, the micro management of sounds electronically. He basically uses algorithms created by others and plays with his material as a carpenter plays with wood, goes with the grain, not forcing it. He teaches this approach to his students. He believes in open source applications; hence the main programs that he uses are Super Collider and Reaper, although he does buy some expensive add-ins which can augment the musical process. He likes to create an all-round sound for multiple channels, such as for fifteen channels at the RCA. Recently, he has the opportunity of working with architects with budgets that can afford to extend the range of sounds. He is excited by this as it is a new field where architectural spaces can be designed aurally. We agreed that there was a new ethical dimension to this, of power, not in a Foucault sense, that is not controlling. Finally, as regards music’s potentiality to literally affect building fabric, such as bricks, he thought that in theory this was so, and extended this with the fact that everything is vibrating. By this he implied that all things are related, are in constant motion and affecting eachother in some way. His is an existentialist, of the moment, practical, almost pragmatic, activist, approach, with ethical concerns thrown into the mix. To use his model of making music from buildings, perhaps a starting point could be to work out what the

political message is and then experiment with portraying that; in the process, largely working electronically, freely experiment.

Guillaume du Fay

Guillaume du Fay's composition *Nuper Rosarum Flores* of 1436 is one of the earliest recorded instances of music composed *for* architecture, for the dedication of the cathedral in Florence (Padrós, 2008). The implication for this research, is firstly, that it is consolidating the emerging answer to this thesis's first question, that there *is* such a linkage, between architecture and music, to the extent that it hardly needs questioning any more. This is now accepted as a given. The mechanisms of the linkage are still worthy of examination. The various methodologies associated with different people encountered during the general search provide possibilities for making compositions to evidence this linkage. These will be summarised shortly. Before that it is worthwhile to glean information from Guillaume du Fay, as an insight into composing in an idiom of that period where a spread of composing genres is intended, immersion in the milieu to feel the contemporary influences and to obtain possible compositional suggestions.

Du Fay is held to be a leading exponent of Burgundian early Renaissance choral music of both secular and religious flavours (Padrós, 2008; Robertson, 2010; Encyclopaedia Britannica, 2018), setting the scene for others to follow such as Ockeghem and Josquin des Pres. According to Guido Magnano (Padrós, 2008), Du Fay based mensural proportions of 6:4:2:3 upon those of Brunelleschi's dome. This is a direct mathematical abstraction of architectural information enshrined in the musical structure. Magnano also explained about other proportions being within the piece, of the *talea*, or note combinatory rhythmic phrases, as multiplied by ratios of 2:1, 1:2, 2:3 and so on. Sometimes according to whether the music was with the *cantus fermi*, or other more obvious parts, which could have different rhythmic patterns of their own, the overall rhythmic scheme might not be easily apparent, yet lead to a satisfying feeling such as he quoted from Leibnitz's later statement that "Music is the pleasure the human mind experiences from counting without being aware that it is counting" (Padrós, 2008). Furthuremore, he elucidated that Pythagorean values of 1:2, 2:3 and so on as embedded with chords can be discernible lengthwise within the piece. Some of these proportions could be said to be from within the ambit of music itself whilst others such as the 6:4:2:3 from architecture, however, given the widely

known consummate involvement of artists, musicians, writers and scientists within a homogenous Renaissance holistic metier, it is reasonable to assume that Du Fay operated within a unified mixture of influences where architecture borrowed from music and the other way around. This is endorsed by Robertson (2010), where she describes how du Fay was steeped in religious iconography and where Brunelleschi, the architect was likely involved with painting, for instance with Masaccio's Trinity fresco of circa 1427 in the church of Santa Maria Novella in Florence, and where du Fay as director of music would probably have seen and been influenced by this painting (Robertson, 2010, pp. 409-10). Brunelleschi was also involved with sculptors, such as Donatello (Biography.com, 2019). There was a thriving amalgam of silversmiths, silk workers, master craftsmen and apprenticeships, patrons, church and state all woven into a vibrant admixture of ideas and skills. It is within this scene that du Fay wrote his music, borrowing from the secular, yet according to Robertson (2010), generally with an eye more on religious matters than profane. The main point extracted from all of this is the lively spiritual element. Numbers, possibly even numerology (yet Robertson effectively rules out superstitious use of numbers, more the inheritance and extension upon numbers as used in proportions handed down from classical Greek and Roman times) play a definite part—and can be taken here as a possible template for architectural composition. Yet influencing these mechanisms is the rich seam of integrated Renaissance life. This is again something that can be taken as an exemplar for modern day compositions to do with architecture, not just antiseptic formulae somehow derived from architectural structures, but somehow a lively informed architecture with other dimensions of life.

Finally, before leaving du Fay, is it too fanciful to see pre-echoes of modern times, a reminder of that, sometimes at least, history has a cyclic nature? Somehow, Steven Daverson's work as explained in his PhD thesis, *A Survivor's Guide to Hostile Structures: The Inception, Enforcement, and Confrontation of a Musical Dogma* (2014) possesses resonances of du Fay. The use of text by du Fay as explicated by Robertson (2010) taken to an extreme deconstructed phonetic extent by Daverson (2014) could show parallels. Perhaps more obvious is the device of measuring the whole duration of a piece, which du Fay defines by his metric devices. This compares with Steverson's consistent approach of defining overall length of pieces and broken down pieces as collections and gradations (2014). Whilst it is felt that Daverson acted upon his own impulses, it would not be the first time that modern day composers draw

strength of inspiration from the past, such as Nono, Maderna (Iddon, 2013) and Maxwell-Davies (Jaffé, 2016).

Some conclusions

Is there a marriage possible between architecture and music?

Some drawing together of conclusions

On the balance sheet of negatives and positives, starting with the negatives, to end on a positive note, I increasingly became concerned that translation of actual architecture to music was impossible. This is due to the media through which the translating material must pass, such that the information becomes, as it were, refracted, like the classic view of the fish looking up through the river, or the other way around, the person standing on the bank looking at the fish, distorted through parallax. Barthes's problem of constantly shifting signifieds and signifyings makes for an elusive scenario.

A solution to this came in the form of my TFT. However, it was put to me that this theory of everything then allows for everything, anything. I had to concede that this was so. For me it was an answer that provided a means of getting around the translation problem, by translating directly, then allowing formally for inspiration as a viable means of composition needing no further justification other than this is the way it works. The problem of allowing for anything then deducts rigour from the research and almost obviates any further searching. Whilst this may be true, a simpler model was then proposed, which was to start from the point of view that (a) music can be obtained from architecture, which by now, paradoxically notwithstanding the

translation problem, has by various means found to be true and (b) to avoid discussing the TFT, which conclusion I had been simultaneously coming to. For me, the TFT explains all reality. The implications of this are that taken to the nth degree this means not a watered down theoretical reality, but the reality of every day, the harsh and lovely reality of the stuff of life that we all lead and have conclusions about within it—more than conclusions we have all the passions, the feelings, the phenomenal happenings of life in which we are actors.

So, as it were, starting from this conclusion of the TFT, forget the theory, the grand theory, and start from the point of view of living within it, the outcome. So, the thesis then becomes transformed into taking whatever means of translating or making musical compositions and performances and listening events, with reference to whomsoever or whatsoever methodology I have found along the way, then to create some compositions in evidence of what I have found in some way explicating architecture musically. It does not have to be a grand explanation, merely something nice, something interesting, something that I can describe methodologically which is interesting for the reader and listener, which can then in some modest way add to the cannon of knowledge and appreciation of architecture and music. During this process some new facets of the cannon needs to emerge to make the whole project worthwhile.

Already, the conclusion that I have come to in this resect is in one word: spirituality. From Stockhausen, Nono, Boulez (Iddon, 2013), Xenakis (his *Formalised Music*, 1992) and many others, there are many examples of the use of numbers, in one way or another: pitch class sets, rotations, transpositions, retrogrades, twelve tone series, hexachords (even my own previous composition Gaetano's Miniature No 1 – Solo Piano Piece, 2016 – not included in this collection, since composed prior to this project, yet useful as a study of Krenek's and Stravinsky's hexachords), tetrachords

and other number based chords, matrices and probabilities (for example Xenakis, 1992), fractals (Xenakis, 1992 and Daverson, 2014), magic squares (for example Nono and Maderna as cited by Iddon, 2013 and Maxwell-Davies as described by Roberts, 2015), even sudokus (as Daverson, 2014, pp. 106-7), classical numerology and classical proportions (as consummately covered by Calter, 2008), The Golden Mean or Section, Fibonacci sequences, or Lucas numbers, algorithms; Greg Lynn's architectural algorithmic approach to dismantling symmetry (2005). There are likely to be many other instances of number based methods of arriving at musical parameters. These parameters are then applied by some way to the necessary features of music, such as pitch or frequency, duration, timbre, texture, mode of attack, note values, intensity or dynamics, structure, substructure and so on. It is certainly the intention to apply at least some of these techniques in a search for an expressive medium for creating and communicating music in connection with architecture. For instance, architectural parameters of structural calculations, or key features, or outlines could be translated into data (as Milton Mermikides has done, 2010, 2014 and 2018) , which can then be translated into musical parameters. However, is this enough? Is it original? Can one really add to the canon this way? Are the dimensions restricted even if the music has layers, verticality, horizontality, and even hints at more than the usual amount of dimensions? An answer could be as outlined in Iannis Xenakis's *Formalised Music*, first written in 1922 (1992 edition used as updated by Sharon Kanach) aiming for 'truth, immediate, rare, enormous, and perfect.' (chapter, page 1) to be judged by 'the public, or connoisseurs' (preface, p. xiii), the validation of which could take up to a 'few years to centuries or even millennia'[!] (preface, xiv), where the aesthetic choices made are up to the individual, 'radically alone' (preface, p. xi) and never for 'power, glory, money, …'—pure Adorno.

In a way, du Fay has the answer: an integrated new Renaissance, a spiritual imbuing into the music, drawing from a lively immersion, from all around. In other words, an active participation, in reality—which is, as gained from the TFT, even if the theory is going to dropped for reasons of practicality, multi-dimensional. So, even if the music produced is not seized upon with fanfares, the music itself would be adding to the sum total of experience, a commentary upon the composer, an individual voice in a sea of voices and influences. Where the influences are directed to be architectural, then in some way the music produced would supply some commentary upon the architecture being focused upon. The thinking processes and influential figures and methodologies affecting each piece of music as produced will be explained. This will be the window into the kernel of this research.

A comparison of architectural and musical style timelines

Are their commonalities with a thought for other arts?

From experience of teaching within multi-disciplinary scenarios it is apparent that there is a cross bleeding of influences, colour schemes, shapes and concepts, across, for instance, clothing fashion, to furniture design, to interior design and its related discipline, architecture, sometimes with lags of time and geography. It has been well recorded that the general sweep of ideas, be they of mathematics, science, philosophy, religion and the arts, including music and architecture, generally start in the east somewhere, say Persia, Babylonia, Egypt (ironically involving several modern day areas of strife, such as Iraq, Iran and Syria) and then work their way through the East Levant, classically involving Greece and Italy, then through Europe, Germany, France, ending in England. A classic exponent of how this happened architecturally is Sir Banister Fletcher's massive tome, *A History of Architecture*

(1987). This explained a geographically based lag, also a time lag. With modern electronic communications and faster travel these lags are greatly reduced.

So, the intercommunicatory nature of information flow between these disciplines hardly needs elaboration. In effect, they are self-evident. To illustrate these cross linkages, with some dislocations and or lags the following table has been compiled (**Table 2)**.

A selection of style periods—a spread to support thesis

Architecture			Music			Other – Fashion (clothes, furniture)		
DATE	STYLE	Features	DATE	STYLE	Features	DATE	STYLE	Feature
11,600- 3,500BC	Prehistoric	Mounds, monoliths, geometry, circles, Göbekli Tepe, Stonehenge, roofs?			Speculation about early humans, language, music and evolution not specifically cited here			
3,050- 900BC	Egyptian	Pyramids, columns, Imhotep, King Tut, influencing Roman and Art Deco, decorated columns and entablatures			Harps, flutes, lyres, double clarinets, Pythagoras	3000B C – 2000- 200 BC	Egypt	Cotton, kilts (men), long dresses (women) Egyptian furniture Ancient Greek furniture
850BC- 476AD	Classical	Greek, Hellenistic, Roman, orders, Vitruvius *de Architectura*			Rhapsodes, songs, flutes, lyres, aulos, cithara, Terpander, Arion, strophe, antistrophe, modes, Aristotle, Aristoxenes	3000B C	Greece	Long gowns, often woollen
527-565	Byzantine	Constantine, Justinian, Byzantium-Constantinople-Istanbul, East-West,			Development of ancient Greek, eight *echoi*, *troparion*, *kontakion* & *kanon* hymns,			Centre of fashion, geometric patterns, Greek influence, influencing Roman,

(Also 6th- 19th C)		domes, mosaics, transitional era			*ekphonetic* neumes, *St* John of Damascus, Cosmas of Jerusalem, Chrysanthus, Russian & Greek Orthodox church chants			Saxon & Carlovingians, rich ornamented brocade, long folded drapery, status and class differences, dalamatica, tunica, gown
800- 1200	Romanesque	Round arches, thick walls, heavy piers, Europe, church cruciform shape, early mortar & concrete, drainage, hypocausts, aqueducts, baths	800- 1450	Middle Ages	Gregorian Chant, Organum, polyphony, Holy Trinity, sequences, melisma, free rhythm (early precursor of modernism?), plainchant, text based, Hildegaard, Pérotin	400 AD	Roman	Style leaders, togas worn to show rank
						1000- 1300	Middle Ages	Warmer clothes as northward migration to Europe with changing styles, armour or simple working clothes
1100- 1450	Gothic	Structures, height, ribs, vaults, buttresses, pointed windows, decorations, Moors, French, German, 19/20th C revivals	1510- 1557		Ordinary & Proper Mass, Josquin (4 voices), joyful harmonies and metre, Council of Trent1545-1563, Palestrina (6 voices), freer, polyphony, some homophony	500- 1450 1567- 1625		Mediaeval furniture Jacobean furniture

1400- 1600	Renaissance	Classical reawakening, Vignola, Palladio, Villa Rotonda, Italy, France, England, mannerism, later USA neoclassicism	1450- 1600	Renaissance	Vocal emphasis of text, imitation, balance as in other arts, richer bassline than mediaeval, harmony, flowing	1600s	Enlightened Ages	Europe dominant: fine silk & satin
			1601- 1605	Late Renaissance	Secular, madrigals, Artusi v Monteverdi, emotion, dissonance, chromaticism			
1600- 1830	Baroque	Complex and irregular shapes, opulence, contrasts, Caravaggio, Bernini, Rubens, Rembrandt, Vermeer, Velázquez, Pascal, Newton	1600- 1750 1712- 1721	Baroque (concerti)	Handel, Bach, Purcell, Vivaldi, opera seria, recitative, basso continuo, ostinato. chiaroscuro, major/minor, tonic, Venice, France,	1628		American colonial: suits & leggings (men), long dresses & caps (women)
1650- 1790	Rococo	Elaborate, curves, ornate, plaster, pastels, gold, French 18th C, Age of Enlightenment/Reason, Europe, Russia, S. US, Zimmerman/Frank Lloyd Wright, *Gesamkunstwerke*	1722 1742	(prelude & fugue) (sacred)	England, violin, concerti, form, three movements, ritornello	1650- 1790	Rococo	Scale, r*ocaille*, *barocco*, marquetry/parquetry, Chippendale, Meissonier, Régence, Queen Anne, William and Mary, Empire waist
					Mozart (1756-91)			
1730- 1925	Neoclassicism	Order, symmetry, classical democratic ideals	1750- 1800	Classical	Freer than Baroque, symphony, concerto, sonata, variation, rondo,	1830 1840		French fashion voluminous skirts of 1700s return

					opera buffa, four movement symphony	1856 1870		colour: synthetic dyes Woolson first ready to wear clothes
1890- 1914	Art Nouveau	*Jugendstil*, *Sezessionsstil*, *Modernismo*, Gaudi (modernism precursor?)	1890- 2010	XX & XXI Century Classical Composers (Cioccoloni , 2012) i.e. modernism	Late romanticism, symbolism, neoclassicism, American avant-garde, expressionism, futurism, serialism, Les Six, mysticism, neoromanticism, microtonality, indeterminacy, extended technique, musique concrète, graphic score, open form, micro polyphony, stochastics, elektronische musik, live electronics, minimalism, new simplicity, spectralism, new complexity, stochastic aleatoric live synthesis, high texturalism Satie, Debussy, Scriabin, Strauss,	1890- 1914	Art Nouveau	Fabrics & graphic design led, then architecture & furniture, Arts & Crafts from industrialisation reaction, William Morris, John Ruskin
1895- 1925	Beaux Arts	Crystallisation of former classical order, symmetry, formality, grandeur, ornament,				1900 1919		Slimmer & shorter (women), longer (men), US navy T shirts
1905- 1930	Neo Gothic	1924 New York Tribune Tower, Walpole's Strawberry Hill, Victorian				1919- 1933		Bauhaus furniture
1925- 1937	Art Deco	Eclectic: ziggurats, machines, zigzags, vertical lines, jazz, triangles, trapezia, Egypt, near and far East, Indian, Mayan & Aztec, simplifies in 1930s to Art Moderne, NY Chrysler Building				1930s 1930- 1945		Shorter skirts & jeans (Levi's) Modern furniture

1900- Present	Modernism styles	Art Moderne, Bauhaus, Gropius, Deconstructivism, Formalism, Brutalism, Structuralism, Luberkin, Mendelsohn, Chermayeff, De La Warr Pavilion, Postmodernism, Koolhaas, Pei, Le Corbusier, Johnson, van der Rohe, traditional forms, unexpected, playful			Sibelius, Godowsky, Ives, Schoenberg, Ravel, da Falla, Bartok, Berg, Webern, Stravinsky, Prokofiev, Milhaud, Poulenc, Hindemith, Copland, Matyushin, Ornstein, Cowell, Gershwin, Varèse, Sorabji, Partch, Messaien, Shostakovich, Khachaturian, Britten, Cage, Scelsi, Babbitt, Harrison, Schaeffer, Berio, Boulez, Zimmermann, Feldman, Brown, Ligeti, Xenakis, Stockhausen, Nono, Ashley, La Monte Young, Tenney, Penderecki, Oliveros, Lucier, Riley, Reich, Glass, Schnittke, Part, Braxton, Rzewski, Rădulescu, Murail, Rihm, Ferneyhough, Truax, Wood, Minchiacchi, Finnissy, Mitterer, Chin, Avram, Adès, Hersch,	1960- Present	Modern	Transitional, freer clothes & hairstyles Linked to technological, cultural and political changes, first motion picture 1896 & ‘talkie’ 1927 , Bakelite 1907, the zipper first used in 1923, air conditioning 1932, TVs first regular use in USA 1948, warfare including the ‘cold war’: [this produced competition and an abundance of new technological materials. The second world war, Hiroshima and Nagasaki changed people’s view of the world, science and global perspective, perhaps leading to new enlightenment in solutions to global
1997- Present	Neo- Modernism & Parametricism	Computers, Frank Gehry, Museum of Bilbao, Blob (Binary Large Object), Selfridges by Future Systems, The Sage Gatehouse, The Experience Music Project, Schumacher						

					Saunders, Roads, Azarova, Janulytė			warming and sustainability]
Source	Jackie Craven, 2018			Jackie Craven, 2018 Preceden, 2019 Classicalworks, n.d. Infoplease, 2018 Daniel Cioccoloni, 2012			Jackie Craven, 2018 Padraig Cahill, 2016, Furniture SoftSchools, 2019, Fashion World4.eu, 2018 KSUM, 2019	

Table 2 Comparison of Architectural and Musical styles as well as others, such as furniture and clothing fashion, Grant Gover, 2019

Lessons to be leant

Studies of style periods chosen

Whilst there may be other interpretations of periods involved in the table above, their dating and that other periods could be included such as the various Georgian and Edwardian periods, Regency (not the same as Régence) and many other subdivisions of periods, the overall picture is substantially correct to substantiate the thesis of cross correlation between disciplines. This can be patently seen. Then regarding the musical interpretations, where it may easily be seen that various modern composers have been left out of the examples, such as of Helmut Lachenmann, those listed have for this reason been recorded simply, as the perhaps arbitrary, selections of Cioccoloni (2012), and as his period designation 'XX & XXI Century Classical Composers', together with the elicited movements or modern style periods. This is considered sufficiently wide ranging as to indicate the various influences involved. As a bonus the last name on Cioccoloni's list came a pleasant surprise, to find a modern composer of such delightful atmospheric, textual music, Justė Janulytė (who's music can be heard via http://www.mic.lt/en/database/classical/composers/janulyte, latest piece dated 2018).

Possibly others have realised this, but it was interesting the see Jackie Craven's (2018) classification of Mozart as Rococo. Where one has traditionally thought of Mozart as 'classical' the ornate nature of the Rococo does in fact fit. This may also yield an insight into some people's antipathy to Mozart (although I personally find him to be in the same class of perfection as Bach) where some find the Rococo to mean an excess of decoration rather than as a refinement of the Baroque.

A glaring omission is all to do with popular music. Jazz does have a fleeting reference in mention of Gershwin and Ravel, but, despite Adorno's well-known dislike of jazz, there is such a wealth of further information that could be elicited,

regarding the whole canon of jazz composers and extemporisers, not to mention the modern world of rock music, music of other cultures and the almost infinite number of sub-genres, proliferating like gene multiplication. They need to be included but for the sake of reduction to manageable proportions, let them just be tacitly implicated, in the air, as it were, to draw from. An inference here is that the amount of information that can be drawn in to modern compositions, is, as much with modern life, increasing at an exponential rate. Whereas in the nineteenth century, music was about well defined themes, in modern times the net is cast increasingly wider, so that anything can become a topic for music, even the process itself—so wide that it would be impossible to categorise all components in one relatively short simple table. Where on the whole the music intended for this research fits into the sort of categorisation encompassed by Cioccoloni and the point is made about the correlations, then it is sufficient to leave the table as above with its idiosyncrasies as it is[ii].

Finally, a word or two needs saying about the genres to be adopted for this research. It was stated early on that a wide spread was to be aimed at and having already produced several compositions during the process it can be seen that this aim has already largely been achieved. It is intended to provide an account of the specific compositions relating them to this research with commentary upon how they were derived along with suitable references to theories and influences. So, it is sufficient here just to say that the compositions made so far fit categories drawn from the table, plainly, as: early, baroque, classical, electronic and broadly experimental. That last word does not explicitly appear in the table, but it fits so much that is modern and could apply in one way or another to the composers in Cioccoloni's list as to feel justified.

Lessons learnt to use in compositions

No doubt the fruits of what has been learnt will come out in the explication accompanying the compositions, yet to come. Duplication here would be superfluous. Perhaps it would be worthwhile to merely highlight some stand-out points. These points will not be elaborated here. This will occur within the separate reduced account that will form a stand-alone companion to this fuller research. Some abbreviated points are:

- Humour—as Will Alsop and post modernism
- Simple feeling, tactility, haptic response to surroundings—as Katrina Burton, Cevanne Horrocks-Hopayian and latterly as found Justė Janulytė
- Mathematical stratagems—as Milton Mermikides, Gubaidulina (Macleod, 2017), Maxwell-Davies and others.
- Metaphor—as my piece *A Walk Around Oxford Late at Night* and its spin-off piece *Radcliffe Camera*.
- Elemental translation—as Charles Jenckes and Peter Adjaye
- Spiritual, mystical—churches, cathedrals and early. So far, this has only produced a short piece called *Upon Hearing Guillaume du Fay*.
- Objective/Subjective—as Malevich's Suprematism, which resulted in *The Life of Zaha Hadid*.
- Painting—after discussion it was held that painting itself is valid in the context of architecture. Witness here Bridget Riley, which led to the piece entitled *Nataraja*. This piece also evidences an experimental approach utilising colour theory, touching upon synaesthesia. It also refers to a direct approach of the philosophy of Bridget Riley, which has similarities with that of Hildegaard of Bingen. This piece also includes reference to Elliott Carter's all-interval chord.

- Objects as valid architecture—similarly to painting after some discussion it was agreed that objects themselves are valid as architecture, they are designed constructs. In this mode I wrote *Study III Glass* and its adapted follow-up displaying some electronic additions of harmonics.
- Electronic music—within this category falls *The Life of Zaha Hadid* and the adapted version of *Study Glass III*. This piece could also be seen to have some reference to Matt Lewis's 'sound art'.
- Semiotics—some pieces have been produced in connection with reading about the work of others, such as *Schadenfreude* and *Study II en memoire d'Alison* stimulated by Steven Daverson; *Study IV Norland Trio* in relation to Daniel Norland; *Symphonic Study* in relation to reading about Walter Benjamin; *Passiflora Caerulea* written for CoMA based upon a South American flower.
- Translational—St Hilda's written for CoMA and trying to evoke the architecture of the façade of the college with shades of a mix Charles Jenckes's and Milton Mermikides's methodology.

The above bulleted points provide a flavour of the research and results obtained so far. As stated, this is to become the germ of the derived research of compositions with commentary.

Methods of composition

Language, semiology and semiotics

Having decided by this point to reduce the research to compositions with commentary, extensive coverage of these points as originally intended would be superfluous and or produce literally too much material. On a personal note, having developed an early interest in philosophy, including buying a copy of A.J. Ayer's *Language, Truth and Logic*, the work of Bertrand Russel and Ludwig Wittgenstein

amongst all the others in a great canon of philosophers from Plato and Aristotle to those of the modern day, including Barthes, Deleuze and Derrida, the importance of language and its translation is a vital analogy for translation of architecture into music. An important reference is *Leiden Translations* by Alistair Zaldua and Adam Hodgkins (Margarint, 2015) where ancient sigils on papyrus underwent several processes of translation to produce a score for a double bass where the playing was filmed, also translated into deaf-mute sign language. This involves the whole philosophical aesthetic discussion of meaning as translated through various media—and this precise point was an area of concern which the TFT theory attempted to address. Since it has been decided to shelve this theory and concentrate upon overt musical matters and whilst there will be some remaining validity to this whole area of debate it is intended from now on to make passing reference to such concerns where relevant to the argument without entering into tendentious discourse.

Translation means, a discussion

This has been discussed immediately above and elsewhere throughout this research. In essence, the aim is to translate from the language of architecture to that of music, where the philosophical issue is: how much original architectural DNA is transmitted to the music. Where this has been a concern, it is simply accepted that this can occur in a variety of ways, by content to content, suggestively, romantically, whimsically, metaphorically, figuratively, numerically and so on.

Data translation

The term of data translation is largely attributable to Milton Mermikides, when in answer to a direct question I put to him during his talk at Christchurch University (2018) about his compositional methology, he replied that he simply used data. This is amplified on his website (*Data sonification*, 2018). So, for him it was simply a matter

of obtaining numbers from whatever source he used, be they medical, astronomical or architectural and then translating this via computer programs into music, as electronic music for synthesized instruments or other means as suitable.

This term is also taken to mean the taking of any architectural element or part of that element and creating a musical counterpart.

Mathematics and musical composition

This can range from Milton Mermikides's use, classical proportions, ratios and formulae, even dice throwing, random number generators, and I Ching, as used by John Cage, for determining musical parameters. An interesting point for me is as regards the composer. How much is determined by the composer and how much by the programming? And related to this point there is a modern tendency to deliberately extricate the human hand to avoid interfering with the programming. Sometimes this is necessary, to set initial conditions and rules and occasionally intervene when something does not quite work out correctly, or to edit in order to deliberately input some human touch into the music. Sometimes as with the interface between computer generated music and live performance when there can be feedback and some measure of control or input during live performances then perhaps this can be viewed as an interesting experimental area of hybrid man and machine where unexpected results can ensue, yet frequently within pre-set boundary conditions.

An aim is to take away human conditioning to arrive at stochastics that provide music that a human would not ordinarily think of (Xenakis, 1992; Exarchos & Stamos, 2008). However, there also seems a culture of semi-fear where in the post modern world humans are frightened to make human statements, in the form of music, ceding control, perhaps partially, to the program. This is a lively debate where inherent in postmodernism is the concept of mankind making just the sort of human intervention just lamented as possibly absent. Perhaps the greatest area of human

intervention is during the live mix of electronic, real performers, instruments and singers, such as of Louzeiro (2017), where an element of risk adds a spice of fear and amazement at the outcome inevitably incorporating some degree of indeterminacy.

Computers and composition

Computers can be used as an aid to cracking numbers to convert data to musical syntheses, as with Milton Mermikides, to make instruments, as with Trevor Wishart, or to assist with analysing and bending sound in some way, as with Jaffe (2015). Many modern composers use some form of electronic notation system such as Sibelius or Finale. There is an interesting debate to be had around this, about the media influencing the music. This is inevitable and perhaps why some still prefer to write with a pencil on manuscript paper—and perhaps why some should do so, at least occasionally, as an antidote to letting the machine take over, to occasionally go back to basics and rely upon innate human skills. This was one reason the notation for *Nataraja* was hand written in pencil on A3 ten stave manuscript paper. The feeling is that there are so many parameters that differ from electronic notation assistant programs that this is worthy of a thorough study, as well as a more definite intention to return to manual methods of composition. There are some factors that militate against this. A parallel in architecture, is where manual drawing is virtually eliminated by the use of CAD assisted drawing. Architects can hardly afford to use manual drawing techniques. They are removed from the market due to economic forces. CAD is far quicker, can store and retrieve information, provide starting templates and provide numerous means of assisting the whole process of design, including coupled technologies of BIM and CAM. There is a danger that if architects do not use such technologies they will be left out of the swim. However, as with musical technology I believe there is a debate to be had about the degree of control and creativity, yet this does not seem to be a publicly aired concern—at present, this just seems to be a

concern of mine. The whole mechanism has powerful in-built programs that are increasing in capacity constantly, one example being GD (Generative Design) and TO (Topology Optimisation) (Watts, 2019) where the idea is to do away with architects and let the clever programming suggest variations upon a basis set of patterns. Along with this there is the now eponymous parametricism which also helpfully does much working out and smoothing out for designers—as with electronic music, there is an interface, even a symbiosis, between man and machine. Possibly, there has to be an acceptance, as with Patrick Schumacher that this is the way to go. This is the future. One suspects that there will always be room for the anarchic terrorist warrior who wants to go back to first principles and nature, to start again and re-educate from listening to primal, even primaeval, heartbeats.

Algorithms and Artificial Intelligence (AI)

Much has already been stated upon the use of computer assisted design and music generation. A small discussion on the topic then seems apposite. Whilst in the world of construction and engineering I was very much also in the world of artificial intelligence, a world where intelligent buildings were the utopia. This is still the case. It is possible that Moore's law that applies to electronic components also applies to the world of AI and intelligent buildings. Already there are systems for controlling the environment (EMS, Environmental Management Systems) and other systems besides, to do with security and other issues. They are increasingly becoming integrated and very much tied up with concepts to do with CAD and latest add-ons to BIM, detection and repair, maintenance, costings, records, reports, controls, FM (Facilities Management); the extent is as imagined in ultra-high definition science fiction. Robotics, drones, printing of houses and building. Houses will have feelings and be able form relationships with their owners. Life which is so integrated with the built environment and technology will be transformed. The real question that both the

general public as well as academics in the various relevant fields ask is; can we contain this? Is it manageable/ Will robots/ computers take over? Extrapolating to the nth degree I personally feel that all the imagination and fears of science fiction will be realised, that computers will increase in capacity to outstrip man's capacity by several factors, that robots will become self-learning and sophisticated to deserve rights as equivalent to human rights and that ability to set all of this on a correct course will depend upon fallible mankind. I personally am a positivist (as a typical builder), non-dystopian, as say Steven Daverson admits to, and believe that this super modern world of tomorrow can be super wonderful—we will, in simple terms, have to get our act together and act concertedly together as an enlightened intelligent race on this rather small planet spinning around in the vast cosmos. I believe we can do it. That is the positive view.

Musically, I think there is a corollary. We need to be cognisant of where we are going. Yes, interact with computers, make music with the aid of technology, but ultimately retain a respect for our humanity, not lose ourselves, our identity in computer generated music, perhaps as exemplified by stratagems of Manaris et al. (2007) (although they do not claim to make outstanding music, rather as a corollary to their research into typology), good as it can be, keep that all important human genome in the music machine.

Can indeterminacy help?

As discussed above, indeterminacy can help extricate the thinking composer into different realms otherwise contemplated. Steven Daverson readily admits to this throughout his compositional methodology of his PhD (2014). He did admit to interference occasionally when the outcomes were beyond reasonable acceptability. He admitted to outright composition of a passage for bass oboe, 'intuitively' (2014, p. 112), also, he admitted to an outright mistake (2014, p. 113) through probable

misreading of his detailed structure. In fact his whole structure was an elaborate construction of mathematically derived notes and other playing parameters, but with misgiving he left the mistake to stand with the option to change it later but he stated: 'in truth I think the music I have written is good and any such revision would be merely academic.' This, I think, highlights the integration of the human and mathematical stratagems to compose music. His music though is appealing, with a clarity and separation of instruments, so much so that it stimulated me to write *Schadenfreude* (although that was more from his use of German) and *Study II en memoire d'Alison* (from his use of clarinet in *Schattenwanderer*, 2019).

From a general point of view, where order and chaos are inextricably linked and where indeterminacy has a component, at least, of chaos, then indeterminacy must be the stuff of creativity. It may not be expressly invoked by dice throwing, random tables, or I Ching, but it would be somewhere in the brain, the mind, the psyche, the soul of the composer. Possibly, without this random element creativity would not be possible, so, surprises, even, perhaps especially, self-surprises are to be expected and welcomed.

Electronics in musical composition

By now it is clear that the use of electronics is an essential part of modern music making. I would go so far as to say that in order to be a contemporary composer somewhere along the line one has to adopt or at least have a go at using some sort of electronica. Rebecca Saunders once admitted in an interview (Service, 2016) to adhering to using pencil and paper but admitted that she was building up to composing in an electronic mode. She is perhaps a great advocate for the cause of writing music manually as she explained to Sara Mohr-Pietsch in her interview for the BBC Radio 3 Composers' Rooms (2015). The corollary, the other way around, is that designing manually architecturally is for some still the only way. Sometimes it is

because they do not want to learn the skills necessary to operate CAD and for others it is simply the best way to convey one's thoughts onto the drawing paper. There is a direct connection with cartridge or tracing paper on a drawing board with all the paraphernalia of parallel motion, pencils and pens of different thicknesses (the same size as can be automated in CAD), soft erasers, razor blades, craft knives or even scalpels for removing errors finely and all the rest of the equipment. The two worlds are poles apart and produce different results. Sometimes the two are combined and can produce very slick looking drawings for presenting to clients, as evidenced by such a drawing on the boardroom wall of Clagues Architects, Canterbury (Interview, 2018 as **Appendix A**). The same can be true in music, combining composing at the piano with a manual score, which is then fed into the computer, and as with Rebecca Saunders: experimenting with real sounds and potentialities with musicians especially as regards extended techniques. The hybrid world of pre-programmed music or sounds, in-performance sounds or music, together with real live performance, sometimes with signals or instructions of some sort generated from the interplay of computer electronics and in the moment recorded sounds, either as loops or other sounds as series, chords or other sounds, simulating real world instruments or otherwise unobtainable sounds (or effects)—this is a popular way of making music in the contemporary scene and thoroughly researched by Ham in connection with improvised drumming (2018). My first significant attempt at using electronic means of making music is evident in *The Life of Zaha Hadid*.

Aesthetics, what is beauty in music, philosophy and some problems

From Plato's ideal of beauty to Kant's 'sublime' and other philosophers since who have interpreted beauty in many ways, some even discounting it as a reified objective, others such as Lauren Redhead who sees beauty as 'political' (2015), beauty, in a postmodern world, can become suffused into the context of culture, be

interpreted in many ways, not isolatable as beauty, *per se*, but somehow caught up in the fabric of living. It is as if artists can provide a perspective, sometimes a commentary, a narrative, that helps to explain and illuminate aspects of life which may not be so obvious to those actively caught up in the action of life. They may provide space for contemplation, with silence carved out of space-time within and around the music. This can happen in performances, popularly 'performance art', where movement of performers and audience, participation of some sort, staged effects of lighting, surround sound and other theatrical gestures, can take all concerned, performers and listeners alike, to a different place, for a while producing catharsis and other reactions, even thought realisations, to see the universe, or a part of it, somehow in a transformed way. This state of mind could involve several of the conditions of beauty previously described. For me, beauty is to do with the everyday, where, as explicated in the TFT theory, everything is splendid, reality is 'super', all is interconnected, so there are both discrete objects that are wonderful, as well as being suffused into a greater mesh or matrix, where the concomitant parts illuminate eachother, they vibrate to produce a radiance that in a way returns to Plato's ideal, yet in a real transformed way, as pure brilliance. My short piece *Pieta* is an evocation of Michelangelo's sculpture of that same name. Having long admired Michelangelo as one of the world's real geniuses and as a youth visited the *Pieta* in Florence and seen it at close hand, I go so far as to say that this work may well be of the 'ideal' beauty that some hail it to be, nothwithstanding that in the modern world such notions can seem archaic and outmoded. My short piece uses two viols and a viola da gamba, including a moment of silence before tracing lines over the dead Christ's left arm, then around the outline of Saint Mary and her miraculously executed folded clothing before returning to the dead son in her lap.

Total Field Theory (own theory) – direct methodology

Everything that is in the heavens, on earth, and under the earth is penetrated with connectedness, penetrated with relatedness. (Hildegard of Bingen)

This theory is intended to justify use of a 'direct' method of translating architecture into music. It is not intended to overthrow other methods of translation, semiologically or semiotically, or by other means. The intention is to use other means of translating architecture into music as well as by this 'direct' method. It is an attempt to justify utilising what has traditionally been called 'inspiration', that is, translating by a *direct* means straight from the source, via the sensory input into the human brain, converting by whatever psychological, psychical, or other means going on in the brain, or wherever the processing goes on, resulting with music that can be written down on a traditional score—or be notated in some other way, such as in an open or graphic score.

The theory developed from noticing the connections between notes, to be more than any means of harmonic, Schenker method, Forte analysis, application of Pousseur's and others' fields (Iddon, 2013), or any other method of analysis. These methods are not rejected. In fact they become subsumed into this method, this Total Field Theory (TFT). It becomes all embracing, all everything, where nothing is left out—even the spacing between notes, the types of notes, their melodic, harmonic, temporal, every property of the notes and all their relations to other notes—and other parts of the score, rests, bar lines, clef signs—everything, and all their potentialities. The essential yardstick is to say that, where previously things were missed out of the reckoning, such as the shape of a clef sign and all the spacing around it, the typographical concerns of the lettering of expression marks and so on, these are all to be included now. Whilst this may be the concern of good layout, visually, even from an acute aesthetic sense, this now becomes the concern in a total topological and ontological sense. This 'not leaving anything out' principle is to apply rigorously to even the smallest, seemingly insignificant detail, or set of details. From a mathematical or scientific viewpoint, where previously the understanding was that certain parts of formulae were insignificant and could be left out, they are now to be included. Where certain thought realms are considered impossible to think, they are to be included now. It is realised that the former restricted form of thinking will still apply, but, as before, where insignificant parts of formulae and impossibilities of thought were missed out, or approximated to some extent, every effort is to be made

to include everything. In other words, to be realistic, a greater effort is to be made. It is therefore inherent in these last few statements that where absolute knowledge and conclusions are implied as a result of applying this theory, in the end there will be the danger that the whole scheme of things could be wrong. This is almost a restatement of the position before the attempt of positing this theory to be more rigorous than before. The essential difference is that every effort will have been made and it may appear in the process that there is a measure of rectitude pertaining to this theory. Each reader, person, will have to judge for themselves. I, personally, believe in its efficacy.

The following diagram will serve as an illustration of the points being made.

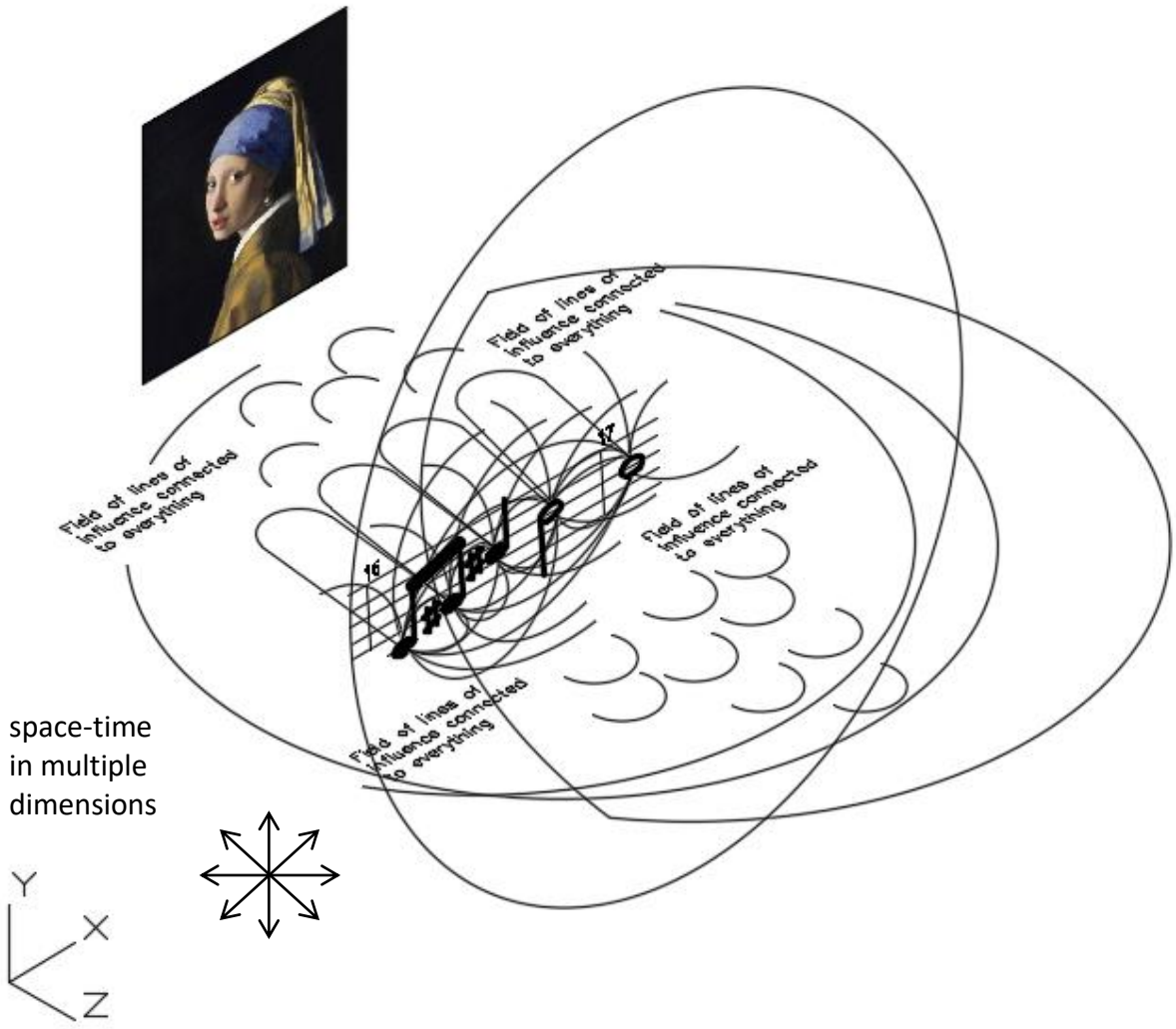


Diagram 1 Isometric view of some notes in Bars 16 and 17 of *Total Field Theory*, 2018, by Grant Gover (see appendix for full score)

The connections between notes and potential adjustments that can be made layout-wise and harmonically are infinite. Indications of these connections are shown by the curved lines. These are the lines that make up the field. **Diagram 2** shows the front view, as it were, predominantly in 2D, where the connections between notes is emphasised. **Diagram 1** shows the wider imbrication of other information. An important next step is to realise that the lines of connection actually connect to more than just bare notes. Everything that one can think of musically is brought in—and, importantly, the net widens to bring in other information, which, as it were, hovers at the edges of nominally strict relevance. In fact everything is brought in without discrimination, except that there will appear to be a selectivity of emergence. This field acts as a black hole and draws in information near the field. It, then, increasingly widens to draw in more and more, until everything in the universe is brought in. If the manifold of this universe is taken as a rectangle, then all the relationships would be there immediately apparent, without discrimination, all of equal emergence, yet since the universe is dynamic everything would be dynamically moving, some parts appearing to be static or relatively static merely because of slowed time in space-time, or distance of the observer in the ordinary real world, close by, or far away. So, all things are related. Some things are discounted, in the same way that parts of equations or impossible thoughts are discounted, but they are still there. The image of the *Girl With A Pearl Earring* by Vermeer is shown as just one example of something related to this field matrix and all things related to this picture as in the parent website [Janson, 2018]—as well as everything else in the universe.

The implication of this theory for musical translation from architecture is that the lines of connection are direct, they bring in much other information, including what could be termed sub-field information, which is a lot of information that could superficially be discounted yet which is there.

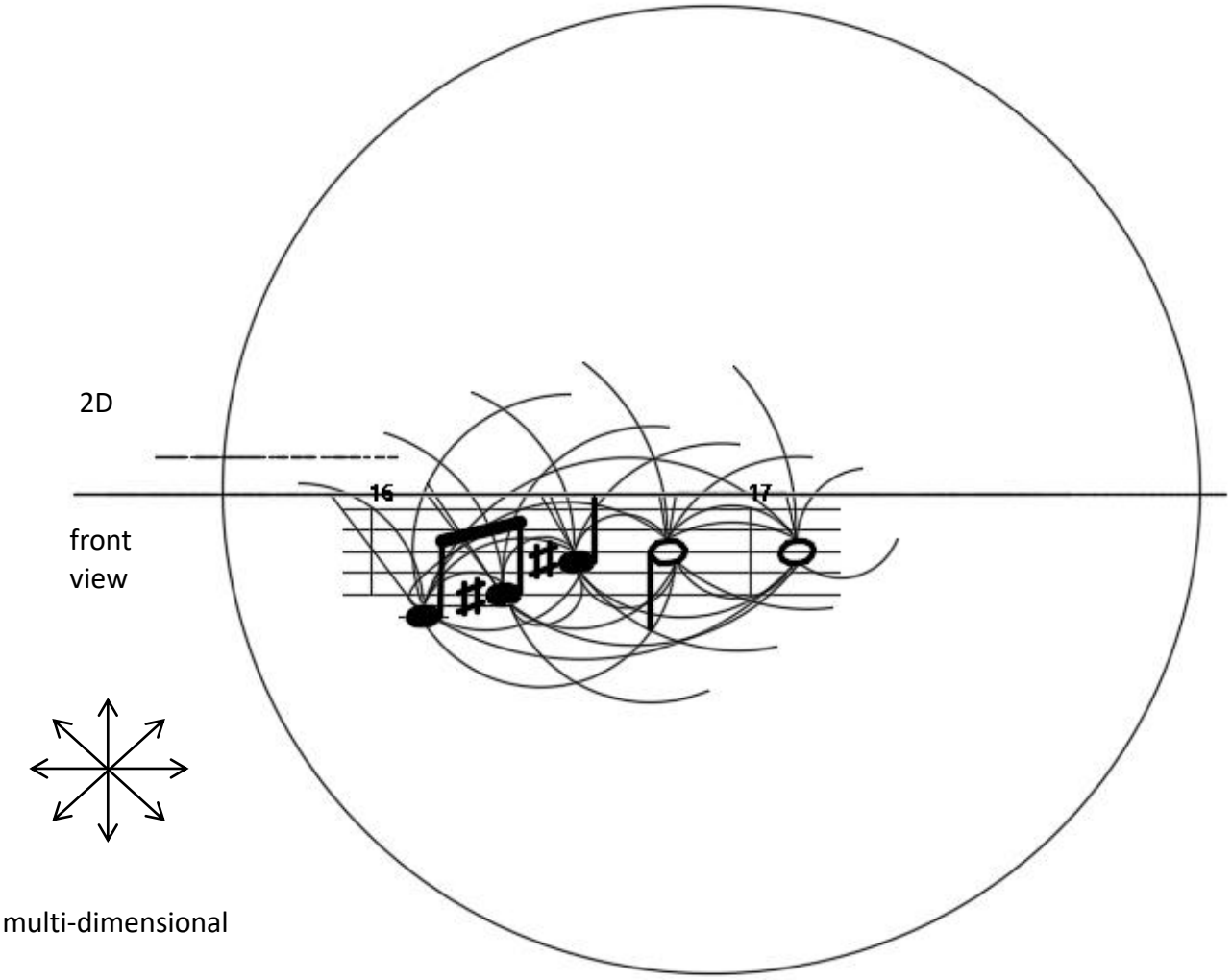


Diagram 2 Orthographic view field around Bars 16 and 17 in *Total Field Theory*, 2018, Grant Gover

The theory has knock-on wider implications than as applied here. It relates to theories of knowledge, cosmology, physics, other sciences, everything to do with life. To the extent that this applies to the interpretation of buildings, in making music as stimulated by them, then this is relevant. The creative process encompasses so many lines of connection and when the content at either end is taken into account this would accommodate 'inspiration' in a classical sense, the unconscious and spirituality.
A good question is: so, of what exactly do the field lines consist? The answer is that they are so numerous and closely packed that they actually are reality. Importantly, they fill out reality to the extent that there is no need for mediating fields in between objects and subjects. They just are.

Having written this statement and then slept on it, whilst there is a measure of truth, it is not completely accurate. There is space between the field lines (Minkowski space?), and although they seem inactive, passive, almost inert, just connecting things,

they actually are dynamic. There is a two-way flow of information as via ‘broadband’, in a similar manner to communication or *information theory*, as in the opening paragraph (Utwente, 2018). Each connection is like a conversation between a mother and a son where the balance of information is not always equal. Sometimes: Yes. At other times the mother will dominate the conversation. At other times the son will be just overflowing with information. The totality of field lines makes a network, like a neural net. The amount of field lines is infinity to the power of infinity to the power of infinity and so on to infinity. This number I call *infiniteplex*, after the fashion of a *googolplex*, only it is much, much larger.

This accommodates the ‘exclusion principle’. Where any adjustment to the number of electrons in an atom’s shell orbit is adjusted throughout the whole universe and explains the phenomenon known as ‘entanglement’, which is partly indicated by the following **Diagram 3**. In other words, the connections are so numerous—and interconnected, touching—that a direct line of communication is maintained across the universe, so that one particle with, say, negative spin, will be paired with its counterpart particle, of positive spin, or the other way around, or whatever is the pairing of particles, or whatever. The significance, or prominence of fields, and their concomitant things that they are connected to, are related to their position in space-time and observers. Just because one cannot see fields does not mean they are not there. There are scales of magnitude or degrees of prominence or significance of fields, in constant dynamic activity. The unseen fields, or if detectable, then nominally unseen, could significantly be part of dark matter and dark energy, with the cosmological constant playing its part, whatever that is. Just positing a guess here, the dark matter could be the things at the end of each field connecting line and the field lines themselves could be the dark energy, where dark energy is the so-called force that acts gravitationally wanting to collapse the universe and dark energy is the so-called force throwing everything apart and causing the expansion of the universe and at an increasing rate. Cosmologically, these points may be debatable, yet it is believed there is sufficient general credence as to enable stating them here. It is clear that music does not operate in a vacuum. It operates in the universe, including a universe containing architecture, buildings and parts of buildings. When contemplating the sheer number of field lines connected with the *infiniteplex* it seems reasonable to assume that the universe is expanding in order to accommodate them. This may be another point debatable in cosmology. Again it feels appropriate. The luxury here is that this model is in the domain of theoretical conjecture, however, there is constantly

the fluxion with the world of reality and science. It may be that by staying within the world of theory useful commentary can be made, however, the *crie de coeur* of Rodney Holder in his book *Big Bang Big* God (2013) that modern cosmological theories are tending towards the theoretical where they are increasingly becoming removed from empirical testing and verification, such as of string theory and multiverses. However, in my self-defence, where this theory is an amalgam of theory to do with music, with wider implications for science and cosmology, there is real content specifically aimed at the musical thesis which is real, and the encompassment of other implications, using the word of philosophers that Holder uses, is 'necessary'. The separation between field lines and things at the end of them, matter or whatever, are probably not so distinct—they probably blur one into the other. There are many mathematical models to do with space. To the extent that they are valid, they would all be subsumed into this total field and it is feasible that conflicting theories can subsist. This is a world of infinite possibilities. This applies to physics where quantum physics can sit side by side with string theory and the standard model, asymmetry and grand design can all sit happily together. Most, if not all, current cosmologists, would probably disagree, generally seeming to favour an *either or* approach regarding things exiting in the cosmos. Of course these suppositions are conjecture, late night intuition, but to the extent that is necessary for the application to the translation of architecture via this total field to music it is my contention that there is enough substantively apparent to make this completely feasible as a means of translation.

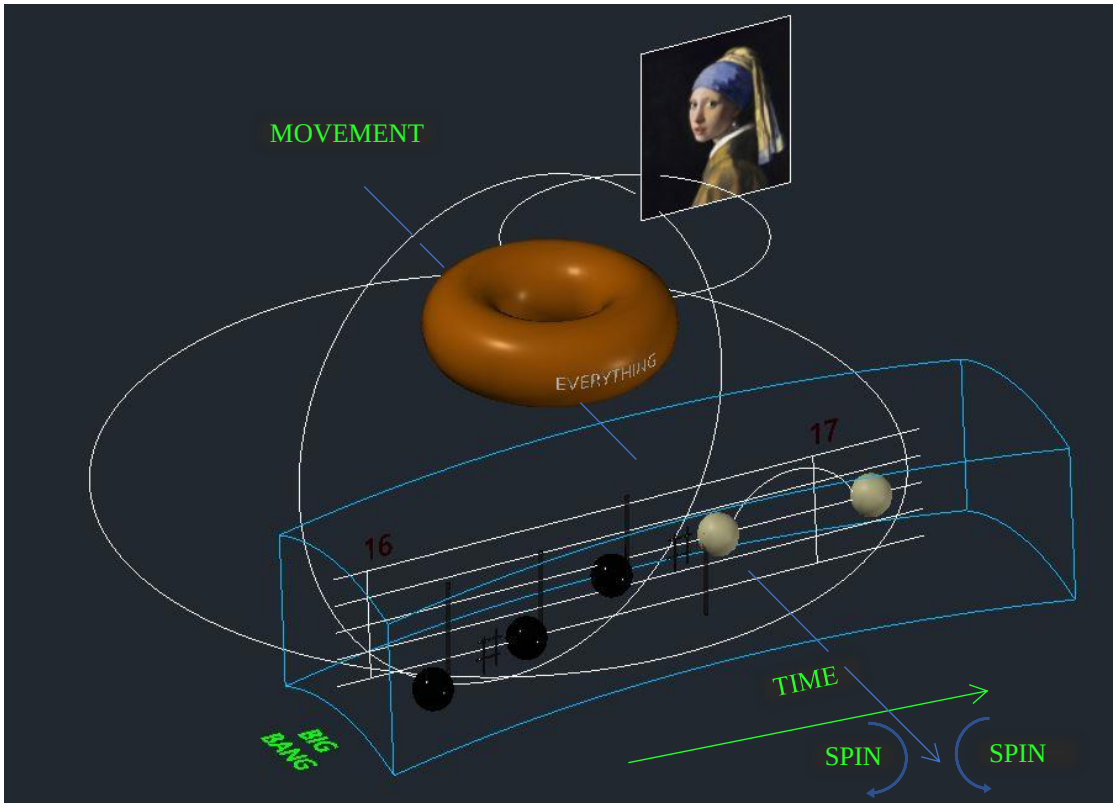


Diagram 3 3D musical arch in space-time connecting to everything in Bars 16 and 17 in *Total Field Theory*, Grant Gover, 2018

In the above **Diagram 3** the notes are represented as in three dimensions, in space-time, starting from the left end, arching through curved Einsteinian space, towards the right, through the arrow of time, with a transverse arrow indicating movement in space-time. The notes would have degrees of freedom, which are greater for more chaotic type music, such as contemporary music, as compared with closely structured tonal music, however, since there are so many parameters, so many things that are connected, this difference is negligible, to parity, or even the other way around, given the number of connected things, which are infinite. The black background represents space. This model as such is a microcosm of what happens in the universe anywhere and could be replicated at any point or set of points in space-time, with the reservation of full consideration of general applicability within the world of cosmology.

Evaluation and applicability to this project (and generally) of own theory from seminar, others' judgement

Other theories have yet to be evaluated. The approach of dotting around, as recommended by Dunleavy (2013), has found that the TFT theory has been evaluated first. This is partly so because it is expected that this may well meet with criticism, which may need responding to and refinement made. So, by completing discussion of this firstly it should provide ample opportunity to make any changes in time before applying this theory to the actual making of music, the use of this method as one of several, five intended at this stage, to process of composition—which will then be evaluated to see whether or not a valid way of making music can be obtained from

people's responses (to be discussed later) and a general weighing up of aesthetic consideration made.

Select methods of translation—a spread to support thesis

So far, the *TFT* method.

Others are:

Inspiration: Whilst abandoning the TFT theory for reasons of brevity and specificality, the outright 'inspired' method, as cited as used by Steven Daverson (2014), albeit briefly, still remains as a method as justified by the TFT. To a significant degree this is evident in *A Walk Around Oxford Late at Night*, as an outright aesthetic reaction to seeing this building uplit at night. This also encompassed an integrated evocation of the multiplicity of architectural styles evident in the Radcliffe Camera as well as a reported complicated working out, if not mismatching, of tracery lines on one website—I took this to be the case initially, then upon closer examination of the pictures available on the *tripadviser* website, found that all the lines visible did seem to line up functionally, in a structurally engineered way. However, the internal lines arriving at points of suspended stalactites of bulbous ceiling ornamentation seemed to me to be the most ostentatious form of ceiling decoration that I have ever seen. Whether this fits normal standards of Gothic tracery could be debated. Certainly, to me, this seemed like an obvious exaggeration of the Rococo style, which can be interpreted as either a refined colouristic extension of Gothic architecture, or an over-the-top ornamentation that the Sun King Louis and Madame Pompadour could have enjoyed. There are elements of the Jacobean and elsewhere, early Italian, English, Georgian, Classical and so on. The building is a riot of periods and a melding of two of the great 'Wren' architects, Hawksmoor and Gibbs. A more detailed analysis will be entered into in the ensuing separate and new pared down research report, concentrating upon the compositions with accompanying commentary.

Again, due to the subsequent intended reporting of the selected compositions in connection with this research, where it will be left to enter into greater detail about methodologies and philosophies relating to each composition, a simple mention here of other methodologies used should suffice:

Sociologically stimulated, such as in *Contrast 1*.

Electronica: as in *The Life of Zaha Hadid* and *Glass* in two versions.

Art: as in *Nataraja*, inspired by a painting by Bridget Riley.

Early Music: as intended initially to examine a range of periods related to architecture. This led to Guillaume du Fay and a short piece obviously entitled *Upon Hearing Guillaume du Fay*.

Semiotics: *Schadenfreude* as stimulated by the use of German by Steven Daverson.

Numbers/ Spreadsheet/ Architectural: *Folkestone Bandstand*. This is the culmination of several methodologies coming together, including *Study Events I*. Explanation of this will be reserved for the separate document.

Others: yet to be debated for inclusion as to suitability, degree of modernity versus tonality and strict relevance to this research are: *Pieta, Passiflora Caerulea*, *Yarns* and *Norland Trio*.

It is felt that a logical thread runs through the compositions exemplifying the connection between music and architecture. This argument will be laid out in the separate exposition.

Ancillary Matters

Introduction

Architectural bearing upon music—pragmatically

Acoustics, auditoria and other sound spaces

A short case study: Kimmel Center, Philadelphia

Music's influence upon architecture

It's a two-way process

Theories of communication—a quick look!

Music and architectural design—and The Project (in association)

Space and time

Can music affect building fabric?

Interview with practitioner in this field

Assessment of interview

Any other interviews in this respect: music affecting buildings and or materials

Assessment of New Age theories as linked to TFT: fields, biofields and other matters, especially as described by Beverly Rubic

The actual project

Introduction

Meeting people, discussions, interviews, an actual project

How it goes—how it went

Conclusions about how these points affect this project

Locations, buildings, architectural artefacts

Choice of buildings

Work in the field, thoughts, logs, photographs

Conclusions

The actual compositions

Recapitulation of methodology chosen—discussion

The portfolio, the scores, recordings

Evaluation

Meaning in music

Psychology, perception and sensations

Feedback

Discussion

Interviews, discussions, questionnaires

Evaluation

Conclusions

Final Conclusions

Evaluation of aims and objectives

Is there any significance to the thesis?

Topics for further research (discovered along the way and considered beyond the scope of this project)

- The wider implications of TFT
- The socio-politico implications of architecture and urban planning where for instance a Care Centre for those with 'special needs' is replaced by a typical housing development. This involves also the debate about housing, key workers and affordability. How this would impact upon musical composition would be with a social conscience of say a composer like Mathias Spahlinger who was awarded the Grand Art Prize 2014 (peermusic classical, n.d.) for his 'artistic responsibility and socio-political consciousness' which musically 'gains its power from the systematic endeavour to bring forth the mechanisms of the conditions of formation that lie beneath the surface of phenomena, and to transform them into incredible sonic inventions.'.
- The whole issue of translation *per se* could be covered more extensively. No doubt there is already a body of research on this topic, which would include the philosophical considerations of transmitting true information from the signifier to the signified. This is a concern of the TFT in which it is hoped that

relationships are explicated in a generally more direct way than as with interposing media.

- The aim of wishing to introduce music into the actual architectural design process would need an elaborate setting up and education of all involved to gain the willing cooperation. This would take resources of time, manpower and could involve an opportunity cost. Most projects these days are tendered to fairly tight margins, not only for contractors, but for architects too. This also applies to developers as in the current climate of planning restrictions and the claimed housing shortage. Development is a prime source of work for some. It is profit driven and where a set percentage of affordable homes have to be included in housing schemes this puts further pressure on the need to make viable returns on the investment of financial and land capital, deployment of management capacity and operating costs. In other words companies are operating at efficiencies that cannot afford the luxury of permitting anything that disrupts the constant flow of mainstream work. This was the case for the architects visited, Clagues (as **Appendix A**), although there were other types of contracts, such as for the local authority and other client types, but all are operating under the economic conditions of the marketplace, which at the time of writing is affected by Brexit. All this means that experimental speculative ventures of trying to input music into designs and measuring the effects would be too risky time-wise and cost-wise. However, in principle, the architect in question did not rule the idea out of the question and I was able to explain some ideas about how tightly architecture has become bound by building regulations, planning laws, use of catalogues and all to meet client needs, where possibly music could introduce some new factor, even of soul. To be fair, this architect, within the constraints described, does his best to stretch clients to consider unusual ideas and has strong humane ethics that he employs across his whole work regime. From previous experience, perhaps a suitable approach would be to make a case based upon increased incidence of profits. This would be difficult to measure, but with sophisticated construction management techniques, such things are possible. Just not at this time. Perhaps this could be an idea for another research project at a later date.
- Whilst some discussion during a visit to the architects Clagues practice was had with staff in all of the offices about the effects of music upon design with some positive results it was of a limited conversational nature. There is room

for a more in-depth analysis of this phenomenon, which it is felt could prove revealing. It could yield the hoped for result that music could add significantly to the currently closed shop approach of conventional parameters, apart from the *fisherman's bridge*, examined above, which did illuminate the actual architecture.

- Debate the assertion that music is frozen architecture. This would involve quite an argument about ontology, the nature of music, its forms and its place in the TFT. (Raised by Charles Jencks).
- Similarly, debate the assertion that music is solely temporal as opposed to the wholeness of architecture. (Charles Jencks).
- The question, raised as an aside, of the extent to which true freedom from interference and or randomness pertains in aleatoric or indeterminate music, as well as in music using devices such as pitch class set tables and magic squares, could bear out fruitful further later research.
- It was considered prudent to refer the considered need for a discussion of CAD as a matter for later research. There are two obvious points of relevance. First, regarding the aesthetic, philosophical and ethical issue of CAD vis à vis the translational import of drawings or designs or other mediating objects such as models to the end product of buildings. The second, possibly in a similar way, there may be something that occurs in the intervening process in an analogous computerised translation of architecture to some musical product. Both of these matters could involve extensive research and discussion. Suffice it to say, at this stage, that I have personally noticed a discernible effect of the medium upon design. Further, the logical extent of computerisation as with BIM (Building Information Modelling) which is directly linked in with CAD has yet to be fully evaluated. As an advocate of AI (Artificial Intelligence) and Intelligent Buildings in architecture and construction, I am not an anti-electronic Luddite, but merely express that caution and thorough consideration of further research in these areas be carried out. It is probably inevitable that the next step of the computer age will come about, in line with those worried about the future of urbanisation, cities, how people will live, our increasingly critical relationship with our planet and this will undoubtedly affect both architecture and music. There will probably be, as Patrick Schumacher of ZHA, advocates an increased usage of parametric design, design by numbers and computers, including design for human behaviour, and the world of music

may well adopt increasing technological solutions into creating, making and sharing music.

- Functionalism: an elaboration of this was avoided earlier in an evocation of Gothic architecture, since it was not the time and place. Thoughts then of functionalism, involved, a basic approach to architecture, designing from manuals, the mantra 'function follows form' or, as usually, the other way around, functionalism in music tied up with diatonicism and the normal 'rules' of music, the functionalism of John Stuart Mill and Jeremy Bentham, mathematical functions, then one could get epistemological and describe various other functions of the word 'function', maybe a banquet, a feast, as possibly enjoyed in Gothic times, but then only for the rich, maybe not exclusively. Within the context of the text, one could easily employ the word function as to the task to be done by structural elements, components and members and materials, of the marvellous constellation of beams, ties collars, rafters, purlins and a host of other essentially timber items (yet other material as well, stone, iron, and glass with its improving technology) excellently traced by Cecil A. Hewett's book (1980) on timber and the joints largely employed by past craftsmen. It is salutary that a modern 'scarf' joint usually means a mating of splayed surfaces, whereas in times gone by it often included complicated cogs, mortices and other means of forming a strong bond. I once worked with a modern day craftsman, Fred Benzies, who could make a 'crown joint', which as he explained and drew an explanatory diagram, operated with high precision in five planes. Such craftsmanship induces not only respect but 'love', as Andrew Clague used this word (**Appendix A**), a wholehearted employing of physical and intellectual talent, that Patrick Webb, another modern day master craftsman as well as philosopher (2018) would enjoy and of course the arch master appreciator and recorder of the Gothic, John Ruskin (1907). There is much in this section that is worthy of further research: not least, the function of the word' function', and a comparison of modern day craftsmanship with that of former days, especially of the peak of Gothic periods. Musically: the parallels, which then could take one to relative parallels and parallel harmonies.
- Based upon Imam Ansari's interview with Peter Eisenman or 23 September 2013, entitled: 'Eisenman's Evolution: Architecture, Syntax, and New Subjectivity' in the online ArchDaily, this would be a good springboard for a

further study of him and what the essence of modernism and poststructuralism is all about, structuralism and post structuralism too, text-wise, grammar-wise, linguistically, subject-object-wise, subjectivity-wise and other points. He is almost an archetypal case study of semiotics, as greatly influenced by Derrida, in architecture and the role of drawings in his scheme of things enlightens the discussions under Saletnik and Koehler (2018).

- The analysis of CAD as an instrument of change and new forms was only cursorily covered in the main text. This would be a fruitful area of an acute study upon architecture, hence upon music as translated.
- The dynamic nature of architecture was called into question by Grewe et al. (2007) and it was noted that this could be debated, however for the sake of the context of balancing length of arguments throughout appropriately that this be reserved for an area of further research, whilst it was felt that by going through Charles Jencks' exposition of the link between architecture and music in the lively fashion employed by him that the dynamic nature of architecture would become self-evident. The dynamic nature of music was a given.
- The notion tied up with computer evolution and composition is fascinating and worthy of further research. No doubt there is existing research in this area, but the nuances of the actual compositional methodology of computers, such as possibly already being investigated by Trevor Wishart (although throughout his development into quite artificial electronic areas he seems to retain a core belief in the human voice (Di Nunzio, 2013) and others such as Jaffe (2015) with his 'maximalist' approach and morphing from natural sounds to computer sounds, not so different from Wishart, and Jonathan Harvey (Jaffé, 2004), again not so different from those two, there are some key philosophical issues that need addressing, perhaps beyond even the renowned Ada Lovelace and Alan Turing tests, the ultimate nature of humanness in music and anything.

Grand Conclusion

Overall weighing up

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Alimurung, Alyssa. (2012). '6 Examples of Innovative Architecture Inspired By Music'. *Inhabit*, 15 September. Available at: https://inhabitat.com/6-examples-of-innovative-architecture-inspired-by-music. Accessed: 02.11.2018.

Amatalraof Abdullah, Ismail Bin Said and Dilshan Remaz Ossen. (2016). 'Zaha Hadid's Architectural Form Patterns'. March. Universiti Teknologi Malaysia, Johor, Malaysia, under submission.

Emanating from a discussion on Researchgate leading to an internet search found this article in the throes of being put together. I did contribute to the other discussion. They asked for comment on this, but it would have taken a long time. Most of the comments would have been about English translation and I considered that such feedback was appropriate to leave to current supervisors. However, the substance of the research is sound and useful in the context of this research. In fact, once tidied up proof-reading-wise this should provide a useful contribution to the analysis of Zaha Hadid's canon of work. As they stated, they carried out various analyses, content, qualitative (perhaps they meant quantitative) and comparative, of a wide spread of her work from as a student in 1976 at the AA (Architectural Association) to 2012, up to when they considered the trajectory of her work style was set, in fact, as to be parametric. She died in 2016, so this is comprehensive. They found her work to largely evolve through various phases or styles: suprematist (heavily influenced by Russian constructivist art, notably Malevich), topographic, fluid, organic, and parametric as already noted. This explains her interest in chaotic systems, rebelliousness, fragmentation, deconstructivism, modernism, keeping up with the latest innovations and increasingly a reliance upon computers as is typified by parametricism. This comes at a stage in my own research where I have concluded that (a) I must produce a composition in a modernistic vein and perhaps use a modernistic building type as the starting point, (b) that whereas my initial feeling, as well as of others, is that architecture can be translated into music, I am beginning to doubt this can be done in a meaningful way. I feel that whatever mechanisms are used, whether semiotically or semiologically, mathematically using data parameters, or by other device or devices, that really all that be claimed is that the musical composition possibly contains an element of DNA of the progenitive architecture. Frequently it is 'represented' by

music, but the music is not ‘actually’ the architecture. For me, the best example of music getting into the skin of architecture is Katarina Burton’s cello piece in respect of the Carr Chapel in Chicago. This is expressive of actual materials used, such as Travertine marble, in a way compatible with the views of Petra Lange Bernt and ‘new materialism’. When I analysed the architecture, including finding that Travertine marble was widely used by the architect in question, Mies van der Rohe, I found that I undermined an understanding, an empathy with the materials of the music and the music itself. So, this was not the approach required here. What was needed was a receptive, empathic, honest, almost naïve, childlike, creative approach, open to possibilities, able to see into things beyond a rationalistic empirical viewpoint. A ‘right’ attitude is needed, maybe as Cleve Baxter found with his experiments with plant intelligence (Gover, 2017) and similarly with Beverly Rubic (see Rubic) with her laboratory culture experiments. The attitude of mind affects the experiment, also the act of composition. The conclusion drawn here is that a wholistic reaction to architecture with a sincere receptive creative attitude is needed and by applying the TFT theory then this may well be the closest possible way to obtain a piece of music that most closely resembles the architecture in question. It is not saying, that other methods cannot achieve results that are effective, affective, stimulating, interesting and so forth to listeners, but the initial assumption that it would be easy to translate architecture may be challenged. That is, when the yardstick is to say with all honesty that the music bespeaks the architecture. The critical word here is ‘honesty’. Again, not saying that other methods are dishonest. Interesting effects may be obtained, and by elaborate means, and one may feel convinced that the outcome is derived from the originating architecture, but the question is: is it really the architecture expressed in the music, or is it something that has been derived by various semiotic and or mathematical and or computerised methodologies that one convinces oneself that it actually sufficiently encapsulates the architecture? Whether or not these qualms are substantive or not, an idea occurs, coupled with (c) a need to delve into the world of computerised music, have a go, experiment, use trial and error—to use these parameters as quantified here. So, the thought is to use all five of Zaha Hadid’s style types as suggestive means of creating music: suprematist, topographic, fluid, organic and parametric. Since Zaha Hadid is overtly one of my favourite architects then a measure of connection, or commitment in the Sartrian sense, should satisfy the sincerity requirement. I would add: passion too, as a more active emotion than mere affiliation with the subject matter. I could provide a balanced critique of Zaha Hadid and her work, but then one should be able to do this of anybody, so I am happy to leave it that I will have a go at trying to compose in a modernistic idiom using these five parameters and that will be my next challenge compositionally. This to me then states that logically I must now become more acquainted with Pure Data.

Anderson, Henry. (2018) live FB post at Korean Church of Queens, 03 June. Available at: https://www.facebook.com/pages/Korean-Church-of-Queens/120990481248526. Accessed: 01.12.2018.

Anderson, Julian. (2019). ‘Composers, Julian Anderson’. *Faber Music*. Available at: http://www.fabermusic.com/composers/julian-anderson/works. Accessed: 05.04.2019.

Anderson. Julian. (2014). *String Quartet No. 2*. FLUX quartet. Available at: https://www.bbc.co.uk/music/tracks/n48j32. Accessed: 05.04.2019.

Ansari, Imam. (2013). ‘Eisenman’s Evolution: Architecture, Syntax, and New Subjectivity’. ArchDaily, 23 September. Available at: https://www.archdaily.com. Accessed: 29.11.2018.

A revealing interview where Peter Eisenman discusses his work and views of architecture and life. Where the search was for any emotion in him, he did admit to some affect and finally emotional implications of his work. His is almost a textbook case of modernism, postmodernism, structuralism and post structuralism. I personally think that he

was a theorist in the Honey and Mumford sense and had some sort of personality defect, in the nicest way, such as being dyslexic, which a predominance of architects are. This interview is worthy of more study, but as with other topics one has to have a measure of self-editing and restraint. I will put this in the list for further research. Eisenman's interest in Alberti is revealing too—I think it probably reveals information about Eisenman, by proxy.

Architecture of Colour Music (n.d.). Available at: http://www.archofmusic.com/chord_scale_mode_lessons/02_circle_of_fifths/circle_of_fifths_04_the_circle_of_fifths.htm. Accessed: 05.12.2018.

Architecture Magazine. (2016). *The Piano Building* Available at: http://architecture-mag.com/content/the-piano-building-in-china. Accessed: 02.11.2018.

'Architectural Sociology'. (2018).Research Starters eNotes.com. Available at: http://www.enotes.com/research-starters. Accessed: 27.10.2018.

A succinct generalised introduction to sociology in connection with architecture under the headings Structural Functionalism (macro level: society, values, micro: e.g. housing issues, Social Conflict (macro: Marxism, conflict theory, I would add Critical Theory, Frankfurt School, Adorno, Horkheimer), Symbolic Interaction (symbols, language, culture, shaping reality, designing environments, organisations, objects, materials, Chicago, Hawthorne effect, I would add many other management theories studied in construction management), Post Modernism (e.g. how architecture has cause and effect upon society e.g. Las Vegas, Smith & Bugni 2002 cited), Applications The Connection Between Sociology (living place interaction, national cultures) and Physical Space (area has such an effect—one of my main subsidiary interests in this research from several points of view).

Arcspace. (2012). 'Sharp Centre For Design'. 16 July. Available at: https://arcspace.com/feature/sharp-centre-for-design. Accessed: 03.11.2018.

Ashtekar, Abhay. 'Gravity and the Quantum'. New J. Phys. 7 (2005) 198.

An introduction.

Attia, Abdelhamid. (2005). 'Evidence-based Medicine Corner, Why should researchers report the confidence interval in modern research?'. *Middle East Society Journal*, Vol. 10, No. 1, 79-81.

A very clear explanation of the confidence interval.

austria-architects. (2007). *Coop Himmelb)l)au, BMW Welt*. Available at: https://www.austria-architects.com/de/coop-himmelb-l-au-vienna/project/bmw-welt. Accessed: 04.12.2018.

Baqersad, Javad, Bharadwaj and Poozesh, Peyman. (2017). 'Modal Expansion using Strain Mode Shapes'. *Shock Vibration, Aircraft/Aerospace, Energy Harvesting, Acoustics & Optics*, 18 April, Vol. 9, pp. 219-226.

Bancarz, Steve. (2015). 'Nasa Discovers Planets and Stars give of music – this is what they sound like'. *Spirit Science*, 15 June. Available at: http://thespiritscience.net. Accessed: 28.11.2018.

Barad, Karen. ‘Post Humanist Performativity: Toward an Understanding of How Matter Comes to Matter’. *Signs: Journal of Women and Culture in Society*, 2003, Vol. 28, No. 3.

Baranyk, Isabella. (2017). ‘7 Experiments that Failed Spectacularly’. *ArchDaily*, 13 March.

I don’t agree that all of these 7 are failures but it is a succinct source for Ebenezer Howard’s Garden City design.

Barthes, Roland. *Semiology and Urbanism*. From a paper delivered at the Centre d’études architecturales, Paris, in March 1967. Published in part in L'Architeltura 150 (April 1968), pp. 822-23. Published in present version as "Des Espaces Autres" in Architecture Mouvement Continuite 5 (October 1984), pp. 46-49. Republished in English in Lotus International 48/49 (1985186), pp. 9-17; and Diacritics, vol. 16, no. 1 (spring 1986), pp. 22-27. Translated by Jay Miskowiec. Forthcoming in M. Frantais Ewald, ed., Dits et Ecrits de Michel Foucault (Paris: Editions Gallimard). Courtesy of Editions Gallimard. (attribution taken from original paper, original date March 1967 adopted).

Barrett, Richard. (2012). *Construction*. Elision ensemble, part of Huddersfield Contemporary Music Festival.

The online notes say that this explores ‘centuries of thought about urban living [hence of strict relevance to this research], promised utopias and harsh realities’. The title, also, brings a resonant relevance to this research. I particularly like the way that Barrett has managed to get performers to improvise, especially at the end, a device I have written in before, yet it seems difficult to obtain the credulity and willing cooperation for such freedom for the players. Spahlinger found the same in *doppelt bejaht* (2009) (Chippewa, 2012-13). The answer here is that Barrett is a respected composer and perhaps most importantly has built up a rapport with the ensemble, working with them, writing for their individual characteristics and no doubt encouraging them to open up to express themselves; the ending is theirs and would be different every time, yet it seemed coherently part of the performance and so would be seen within the context of the composition as a whole. This is an area that fascinates me, and others (see Cook and others, Rink et al., 2019). To be fair to performers, their whole raison d’être is concentrated upon a physicality of a psychomotor type, with restricted practice and rehearsal times, when all they want to do is interpret the instructions in front of them to the best of their ability. So, a lesson for composers here is, either to work with performers and or to write in such a way that any open directions are clear and intelligible in an immediate way.

Barrett, Richard. (2019). ‘Richard Barrett’. *United Music Publishing*. Available at: https://ump.co.uk/composer/richard-barrett. Accessed: 08.04.2019.

Barry, Robert. (2015). ‘Starting From Scratch: Cornelius Cardew and the Orchestra as Insurgency’. *Red Bull Music Academy Daily*, 12 February. Available at: http://daily.redbullmusicacademy.com/2015/02/cornelius-cardew-feature. Accessed: 24.11.2018.

Barthes, Roland. (1977). *Image Music Text*. London: Fontana Press.

Barthes, Roland. (2017). *The Death of the Author*. London: Macat International Ltd.

BBC Desert Island Discs, Sue Lawley, *Daniel Libeskind*, 29 June 2003

Beaman, Jean. ‘Architectural Sociology’, *Footnotes*, December 2002.

Beaman vouches for Valerie Bugni, an organisation and sociology researcher for architects Lucchesi Galati Architects Inc, Las Vegas and Ronald Smith (see below), who are both, Bugni and Smith, joint chairs of the sociology department of the university of Nevada, las Vegas. Their contention is that there is a dearth of applied sociology in architecture and that instead of thinking of buildings as art more emphasis upon thinking of people in buildings in use would benefit organisational, community and societal functioning. Bugni believes such take-up of sociology, which she sees as inevitably on the increase, will help the whole design process of pre~, during and post~ construction. Interconnection and valuing of individuals will be improved, also employees’ connection with the built working environment. She brings outside information to the table about the social make-up of the local community and future population growth. Bugni states that existing areas of sociology are already in use such as ‘environmental psychology, ecological sociology, organisational ecology, organisational sociology, and community sociology. Bugni advocates extending sociological design theory and practice, especially ‘unobtrusive measures’ such as simply observing how people interact with their surroundings in given work situations. My note: how this could apply to this research could be that sociology is taken one step further to incorporate music. Undoubtedly there has been much research upon music in the workplace and in connection with sociology—this will need further research here.

BBC Genome, BBC2,(1988) *Building Sights*, 01 November, Iss. 3387, p. 62.

There is apparently an entry verifying that Piers Gough did indeed present a TV programme in which he looked at the ‘Water Authority Pumping Station on London’s Isle of Dogs, designed by John Outram, that’s good enough to eat in…’.

Benjamin, Lex. (Philosopher) (2018). ‘How much data is there in the universe?’. *Quora*. Available at: https://www.quora.com/How-much-data-is-there-in-the-universe. Accessed: 15.11.2018.

Answer: ‘A lot’. Based counter-intuitively on surface area of a closed system universe and the diameter of the observable universe being 93 billion light years, 10 to the power of 123. This accords with Roger Penrose’s figure of 1 in 10 to the power of 10 to the power of 123 for the likelihood that this fine-tuned universe is God designed and not part of a multiverse, just a power of 10 difference!—but, again, a lot! Incidentally there are I believe 10 to the power 80 atoms in the universe, so we are dealing with literally astronomical numbers. As another commentator stated, if the universe is infinite then the data would be infinite—give or take a few infinities this sounds a very reasonable supposition. I got 10 to the power of 150, which is sort of close given there must be some assumptions made! I got it from 4 x pi x radius squared , where the radius is 93 billion light years, using Lex’s figure, then I rounded up 9.46 trillion km to 10 trillion km then multiplied as for 10 bits of data per millimetre—so there are assumptions and based upon these the figures do sort of agree—in fact, they agree more than they disagree, since one would not expect them to agree given that one is dealing with astronomical numbers—if they did agree to the integer one might suspect a fiddle! So, since not, then it militates for a measure of verisimilitude. However, one looks at it, it is a massive number! Incidentally, Milton Mermikides when he came to CCCU ran through similar astronomical numbers about possibilities of numbers of notes in music and one model came up with if data is of marble size then the universe would not be big enough to contain them, so there are lots of possibilities music-wise.

Berg, Nate. (2016). ‘How Can We Reduce Concrete’s Hefty Carbon Footprint?’. *Ensia*, 13 April.

Betjeman, John. (1966). *In Praise of* Churches. London: John Murray (Publishers) Ltd.

A charming evocation of Anglican churches, capturing so much of what is real about churches, their use, history and architecture.

Bingen, Hildegard of. *Hildegard of Bingen Quotes*. Available at: https://www.azquotes.com/author/21274-Hildegard_of_Bingen. Accessed: 01.11.2018.

Birtwistle, Andy. (2018). *Materials and Film* [lecture]. Canterbury Christchurch University, 28 March.

Andy elaborated the idea of new materialism emanating from his studies of film from early days, through the 1960s, to modern times with Petra Lang-Berndt's advocating of a reappraisal of materialism, artistically and scientifically in minutiae, with a new approach giving agency to material, where, rather than simply using material, a new anthropocentric appreciation is given to material which can speak to humans.

Biography.com Editors. (2019). 'Filippo Brunelleschi biography', 31 January. Available at: https://www.biography.com/people/filippo-brunelleschi-9229632. Accessed: 12.03.2019.

Borchardt-Hume, Achim. (2014). 'Kazimir Malevich'. *Tate*. Available at: https://uk.video.search.yahoo.com/search/video?fr=mcasa&p=malevich#id=1&vid=bd24cd17ed6341cf5c8513e40f132d25&action=click. Accessed: 07.02.2019.

Borges, Jorge, Louis. (1998). 'The Library of Babel'. *Collected Fictions*. Trans. Hurley, Andrew. New York: Penguin.

Boyce-Tillman, June. (2012). *Hildegard of Bingen: Visions of the Trinity- St Paul's Forum* [video]

The life and theology of Hildegard's put into context albeit from a present day view. The theology of the Trinity coincides with a fair bit of my TFT especially her view of Wisdom as being an integration of God and The World as a bound up vibrant dynamic whole as opposed to a linear view of existence.

BRE Media Centre. (2016). 'New straightforward guide to Energy Management and Building Controls published by BRE and ESTA'. Available at: https://www.bre.co.uk/news. Accessed: 16.11.2018.

This provides a background and then a link to a paper on environment controls and ties in with the Enlightened reference below received from the USA. The BRE, as they claim, a reliable leading UK authority on cutting edge technology and standards—in fact several papers via: https://www.bre.co.uk/esos. In a softer way this supports the sociological argument of Bugni and Smith and others for inclusion of more than ergonomic considerations in building design: consideration of how people operate in buildings for human comfort, health reasons and efficiency of learning and business profitability. This can, I would think, help against Sick Building Syndrome. How this ties in with music is to appreciate the wide definition of architecture and then apply this either directly and or by implication, that is with somehow a showing of consideration in the music created. For me, this consideration extends to not only humans but flora and fauna, the living environment of plants and creatures (see the WWF reference of Grooten and Almond).

Brunskill, R. W. (2004). *Traditional Buildings of Britain: An Introduction to Vernacular Architecture*. Strand, London: Orion Publishing Group Ltd.

As with Hewett's book this is a seminal book on nominally ordinary buildings, in fact fascinating. He found patterns in the distribution and forms of house types according to wealth (see next entry). Whether this is relevant to this study may be debatable, but 'forms' are per se and the feeling for nominally humble architecture is something that may transmute into music.

Brunskill, Ronald. (2015). 'Architectural historian – obituary'. *The Telegraph*, 09 November.

BSI. (2018). *BIM Level 2*. Available at: http://bim-level2.org/en/standards. Accessed: 28.11.2018.

Buchli, Victor. (2013). *An Anthropology of* Architecture. London and New York: Bloomsbury.

Burnes, Bernard, Cooke, Bill. (2013). 'Kurt Lewin's Field Theory: A Review and Re-evaluation'. *International Journal of Management Reviews*, 15(4), 408-425. doi:10.1111/j.1468-2370.2012.00348.x.

This is about Kurt Lewin's psychological Field Theory which covers or pre-echoes some of my theory. He talks about the totality of information needed to assess and treat a person within a field of experience, which fields can interact and so on.

Burton, Katrina. (2017). 'Music and Place, Dr Katrina Burton', Edinburgh Napier University. Available at: https://www.youtube.com/watch?v=UDA9LNNbY-k. Accessed: 12.12.2018.

Burton, Katrina. (2018). *Music and Place, Dr Katrina Burton, Edinburgh Napier University* [video; email].

The YouTube video dated as 10.06.2018 was a link in an email dated 14.10.2018 of a conference delivery explaining her approach to a composition for the Mies van der Rohe Carr Chapel as part of the 2015 Open House Project, where four composers responded to a brief to write music for some buildings in Chicago – a You Tube showing of these compositions is available via https://www.wfmt.com/2018/09/07/hear-music-inspired-by-some-of-chicagos-most-extraordinary-buildings, also: https://vimeo.com/144181575, both last accessed 15.10.2018. The vimeo version also shows others and an explanation of ACM, Access Contemporary Music, where there is a thriving community of composers responding to the buildings' internal environments in more places than just Chicago, largely in a general sense of each composer's interpretation or response to the location of ten in an historical situation and often of quite ornate decoration – the music can have references to bygone eras such as the Baroque but all in a modern idiom: it is as such largely idiosyncratic and subjective with some re-interpretation of the historical periods idiomatically.

Butt, John. (2007). *Musical Performance and Reception: Playing with History: The Historical Approach to Musical Performance*, Cambridge: Cambridge University Press.

Burton-Hill, Clemency. (2014). 'Who are the 20th Century's 10 best composers? *BBC Culture*, 21 October.

I agree with her list and would add so many more: John Tavener, Michael Tippet, Thomas Adès, Oliver Knussen, Sally Beamish, Andrzej Panufnik, his daughter, Roxanna Panufnik and of course many more.

Cahill, Padraig. (2016) ‘Furniture Design History’. *Design Tutorials and Articles*, 03 March. Available at: https://www.onlinedesignteacher.com/2016/02/furniture-design-history.html. Accessed: 27.03.2019.

Calatrava, Santiago. (2004). *The Columbia Encyclopedia, 6th edition*. Available at: https://www.encyclopedia.com. Accessed: 30.11.2018.

Calter, Paul. (2008). *Squaring the Circle, Geometry in Art and Architecture*, Wiley.

Calter goes through some interesting Roman methodologies of arriving at some proportions used such as by cutting the square – very interesting – did not know this before, also Pythagorean numerology: again rather interesting.

CaixaForum. (2018). Available at: https://www.esmadrid.com/en/tourist-information/caixaforum-madrid. Accessed; 05.12.2018.

Capanna, Alessandra. (2009). ‘Music and Architecture: A Cross between Inspiration and Method’, *Nexus Network Journal*, July, 11(2), pp. 257-271.

In many ways this supports my thesis and has only been read properly today, 09.01.2019, having written over 63,000 words already. The title alone supports the contention that music can be interpreted by direct inspiration; the methodology reference would refer to expedients and scientific or pseudoscientific methods of obtaining music in one way or another from the built architecture, such as by data extraction and use of algorithms, or other means of paralleling the architectural features with the musical counterparts. She elaborates upon these different methods as superficial likenesses that can be transcribed literalistically or deeper structural, mathematical relationships, such as the Golden Mean, or Fibonacci sequences, that can provide means of translation. She uses the term ‘translation’ where the counterparts are obvious and as in relation to language. She refers to text and symbols, which is the application of structuralism and semiotics. Sometimes she says that the mathematical translations are not always completely obvious, sometimes involving poetic metaphors. She describes a number of recognisable musical terms and concepts. In analysing three examples she likens the staves to linear time with silences at either end and where notes can have particular significance of building elements. She evinces continuities and discontinuities, 3D structure, horizontal and vertical structure of both music and architecture and timbre. There is more and this is worthy of fairly detailed summarisation. Definitely this supports in quite a few ways the contention that music can be translated into architecture—and the thought occurs that some of the processes can be used in reverse to translate architecture into music. So, this definitely needs revisiting, describing, collating and categorising in more detail for explicit use both in the written support of this thesis and in practical extraction of music from architectural objects, buildings, or edifices.

Chartres, Sanctuaire du Monde. ‘The Great Organ at Chartres’. Available at: https://www.chartres-csm.org/en/the-cathedral/the-great-organ-at-chartres. Accessed: 29.11.2018.

Compare with Coram’s (2005) entry below. I was looking to see if Chartres had a fantastic organ such as a Cavaillé Coll, which it does not. The history of the organ is circumscribed ending with the current ‘Grandes Orgues de Chartres’, which Coram (see separate entry) apparently considered to be the ‘Orgue-de-Choeur’ at Chartres, with which an ‘advanced member’ of the Manders Organ forum, Paul Morley, posting on 05 January 2005, tended to agree and then spoke up for the ‘other’ there as ‘quite fun’. I wonder what this other organ is. Maybe this needs further research and possibly I will find out if I get to Chartres next year.

Chippewa, Jef. (2012-13). *Practicalities of a Socio-Musical Utopia, Degrees of "Freedom" in Mathias Spahlinger's "Doppelt Bejaht" (Studies for Orchestra without Conductor)*. Available at: http://newmusicnotation.com/chippewa/texts/chippewa_spahlinger_2013-06.pdf. Accessed: 08.04.2019.

Choi, Leeji. (2009). 'sauerbruch hutton: brandhorst museum in munich, germany'. *Designboom*, 08 March.

Cioccoloni, Daniel. (2012). *Timeline of modern/contemporary classical composers*. Available at: https://archive.org/details/XXXXITimeline. Accessed: 27.03.3019.

Cicmil, Helena. (n.d.) 'Adorno on Hegel and History'. UCL, MPhil Stud Philosophical Studies

Clague, Andrew. (2018). [Interview]. Clagues, 62 Burgate, Canterbury, Kent CT1 2BH.

Lasting approximately two hours, a very informative and genial interview, including being shown around the whole suite of offices, meeting the staff and discussing the ideas of this research. The transcript of this is written up as **Appendix A**.

Classicalworks. (n.d.). *Classical works*. Available at: http://www.classicalworks.com/his.pages/early.his.htm. Accessed: 27.03.2019.

Cole, Jonathan. (2007). 'Music and Architecture: Confronting the Boundaries between Space and Sound'. Gresham lecture, 22 June.

He outlines how composers use and create space (a) in their heads (as a composer, from his own observations of his own creative process, he describes a general mental process of how ideas get selected, cohere and crystallise aurally and visually, becoming physically represented by 'perspective, gravity, weight, height and density'—this bespeaks my Total Field Theory). In support of this last idea of physicality he cites Fausto Romitelli as 'considering sound as material into which one plunges in order to forge its physical and perceptive characteristics - grain, thickness, porosity, luminosity, density and elasticity'. This physicality he elaborates is evident in the technological sonic advances of the French in the 1970s, of electro-acoustic and spectral music, and the use of the Fast Fourier Transform for manipulating the 'components' of musical sound (tacitly implying, thereby, being able to create spatial effects). He cites examples in this respect as being Tristan Murail, Gerard Grisey and Hugues Dufourt, with some leading exponents as Olivier Messiaen, Karlheinz Stockhausen and Edgar Varese, also 'giants' in respect of utilising space in their music, Luigi Nono and Pierre Boulez, and the central topic of his talk, Iannis Xenakis—although it seems that most of his attention is on Stockhausen, possibly correctly, since he did much pioneering work on incorporating space in music, along with other experimentations to do with points in time and other matters as outlined by Martin Iddon (2013)—see below. (b) outside of composers' heads, that is in a real world of space-time and performance, where the properties of space can be further manipulated by separation of groups of players, positioning of microphones (and my note: use of theatricality, together with political import, the use of which Nono was perhaps the leading pioneer – his innovative experiments with staging, directing and separating sound created effective sense of space both physically and in the minds of audiences, as highlighted by Carolina Nielinger-Vakil (2016)—see below– this has led to modern techniques as employed by modern composers such as some British ones, Jonty Harrison, Benedict Mason, Simon Bainbridge and Trevor Wishart. There are many others and

of other nationalities too). (c) philosophically and scientifically (again linking to my theory TFT). He mentions Kant's assertion of the concepts of space and time being intuitive, rather than generalised (which, whilst subsequently being overhauled by Hegel and others, in a way the modern advances in this respect of space and time in music, do tend to return to how this operates in an interplay between technologically produced music and what is happening in people's heads) and then Einstein's space-time. Whilst he states that architecture is more concerned with space and music with time, he acknowledges that both are concerned with boundaries, where music can set up boundaries in time, the durations of which can create 'the illusion of space'. These can be manipulated by a mixture of tempo and musical events ('themes, recurrent motifs, changes in instrument texture, changes in tempo and other important moments within the musical continuity'), with, in his opinion, an unchanging perception of overall time in listeners' heads (he is alluding to the perception of time. There are those who think that time may be manipulated perhaps in an almost real way for listeners, where maybe Stockhausen was a substantial exponent of this. This will be examined later). He then goes on to comment on a further more explicit physical property of space and that is of auditoria, often inadequate, in his, and Stockhausen's opinion (and I agree—this needs further later examination), from an acoustic point of view. This must be a very practical concern of architecture in respect of music. Other earlier exponents of the use of architectural space are Adrian Willaert, Andrea and Giovanni Gabrieli, and Monteverdi, building on the foundations of new perspectives in art in 1400s of Masaccio, utilising the *cori spezzati* effect of physically separating players in the Basilica San Marco. Thomas Tallis had already in 1573 used this separation in *Spem in Alium* with eight groups of singers. This technique was further extended, successively, by Orazio Benevoli in 1628 in a dedicatory mass for Salzburg cathedral with '53 parts, 16 vocal, 34 instrumental, with two organs and a basso-continuo', Berlioz and Verdi in the nineteenth century exploring 'spatial polyphony', then with accelerated use in the twentieth century (continuing in an almost exponential use this century: my note), with notable exponents such as Charles Ives, with two bands simultaneously playing different music marching in different directions, Henry Brant (born 1913) using complex music expressing modern day life, as in *Trinity of Spheres* (1978), with three different groups playing slightly out of sync creating a 'super-imposition of layers within different points in space'. All of this bespeaks Stockhausen, with his extensive work in the field of spatialisation. His list of works include: *Gesange der Junglinge* (1956), where an overhead speaker, creating an ideal sound source spreading out evenly and closely to the audience, was not used—this highlights an example of pragmatic difficulty for architecture (as the creator of physical spaces) to solve—in the future this has been partly met (and this needs further examination). (Mathias Spahlinger has also experimented with the audience sitting close to players in *und als wir* (1993) and *doppelt bejaht* (2009*)*—see Spahlinger (2015) below). Stockhausen's Kontakte (1960) builds upon this idea of even dissemination of sound with opposing rotating taped music and 'super-imposition' as perhaps started earlier with Brand, but more, entering into a realm of truly experimental ways of manipulating sound in space with concepts such as 'isolated space points' and instruments in opposition to rotating speakers 'representing the immobile sound sources in space.'. This sounds very much like a modern cosmological view, which is included in my TFT theory. Stockhausen too, as with Brand and others as cited above, builds upon use of multi groups in *Gruppen* (1957) and Carré (1959-60), successively building up from three orchestras to four with four choirs. This is a definite concern for architecture – how to cope with different sound sources and placement in the physical environment. Brand, Ives and Stockhausen are simply happy with the sound disturbance effects. Modern engineers can create a multitude of correctional and disturbance effects as desired – this needs further examination.

Cole mentions cost, which is a constant parameter for architecture, although for him it is more a rant against his favourite, Stockhausen, not being played enough, the classic 'modern music is not played enough' claim. In many ways Xenakis's concern was similar to Stockhausen's with multifaceted parameters creating panoply of sound. His experience as a resistance fighter, mathematician, architect (and engineer), according to his biographer Nouritza Matossian: 'Xenakis knew that it wasn't the intrinsic qualities of the sounds, such as people's shouts and screams, machine gun fire, rhythmic chanting, but the characteristic distribution of vast numbers of events, many different components engaged in a huge choreography, whose

movement in space constantly altering in mixture and proportion, which produced a composite living sound organism.'. This is very much of the modern era of music and the space age. The words 'space', 'movement' and 'mixture' could be a description of ever shifting gaseous clouds forming nebulae out of which comes life.
Xenakis's role in the seminal Phillips Pavilion which Cole describes as 'at the dawn of a new architecture' (we mustn't forget Edgar Varese as well) and subsequent works, such as *Nomos Gamma* (1967-68) and *Terretektorh* (1965-66), in conjunction with Corbusier's innovative thoughts on elemental and simplifying 'mass' in architecture, probably set the seal for modern architecture and music, the parabola, the wish to do away with floor: ceiling junctions and uninterrupted flows of surfaces. One can see here the impossible structures of arguably the greatest modern architect, Zaha Hadid. As a mathematician turned architect she designed structures that thirty years earlier would have been deemed impossible. There is so much to say about her work that for the time being this will have to stop here, but be continued at a later date.

Colour Wheel Music Theory. (2013). Available at: https://www.youtube.com/watch?v=Viue81moXis. Accessed: 05.12.2018.

Linked to Sanborn and Vatsyayana's book on harmonics, fields, colour and music, incidentally claiming to nail the theory that light waves cannot be compared to sound waves, since sound waves ultimately need the equal tempered system as translated scientifically to a colour system, their colour system and that the undertones of sound need to be taken into account and the squares of waves, the dual waves, then compared which cannot be because light waves have an electromagnetic component which is at right angles to the main wave, therefore the square of both sets of waves cannot be squared in the same way and therefore cannot be compared. The only way they can be compared is via an arbitrary system as Weber pointed out in 1800s that there is a 1:1 correlation between numbers and perception, so that if one sets up a system of belief or perception one could then believe that the waves correlated. Synaesthesia is one such arbitrary system where people probably find correlation through chemicals in the brain or something like that.

Coney, Brian. (2018). 'Yoko Ono – "It seems like plain hypocrisy that I'm still alive, surviving and not speaking out, the artist on writing a vital chapter at the age of 85'. *Loud and Quiet*, 18 October.

As feisty as ever, still speaking out for world peace, making activist music and, rightly, in my opinion calling for a feminist and feminine influence in the world as a solution to warlike politics.

Coomer, Martin. (2014). 'Malevich'. *Time Out*. Available at: https://www.timeout.com/london/art/Malevich. Accessed: 07.02.2019.

Coop Himmelb(l)au. (2001-2007). *BMW Welt*. Available at: http://www.coop-himmelblau.at/architecture/projects/bmw-welt. Accessed: 04.12.2018

Coram, David. (2005). 'The Worst Organ in the World'. Available at: https://mander-organs-forum.invisionzone.com. Accessed: 29.11.2018.

A humorous thread of possibly typical almost bitchy comments about organs, starting with the 'Orgue-de-Choeur' at Chartres cathedral. This compares with the official website under the heading above of Chartres, Sanctuaire du Monde.

Cover, Thomas, M. and Thomas, Joy, A. (1991). *Elements of Information Theory*. New York: Wiley & Sons.

This book demonstrates how information theory is alive and kicking, very much so. It possibly is the case that because it has gotten so entrenched in advanced mathematics that it is esoteric to those studying in this field, whilst to others it may appear to have disappeared.

Craigsbank Parish Church. (n.d.). Available at: https://www.craigsbankchurch.org.uk/contact-us/history/history.php. Accessed: 13.12.2018.

The official church website with interesting photographs showing the 'The Church on the Hillside – the Covenanting Conventicle' principle due to lack of space designed by Mr W. Kininmonth of Rowand, Anderson, Kininmonth & Paul, and the beautiful stained glass window transferred from the chancel hall.

Craven, Jackie. (2018). 'Architecture Timeline – Western Influences upon Building Design'. *ThoughtCo*, 25 October. Available at: https://www.thoughtco.com/architecture-timeline-historic-periods-styles-175996. Accessed: 26.03.2019.

Craven, Jackie. (2017). 'The Meaning of "Form Follows Function", The Tall Office Building Artistically Considered'. *ThoughtCo,* 23 October.

This is a neat encapsulation of the thought Form Follows Function which she adduces to Frank Lloyd Wright's mentor Louis Sullivan in an essay of 1896, The Tall Office Building Artistically Considered. She elaborates FLW and quotes him as saying 'Less is only more where more is no goo' [where Less is more is adduced to Mies van der Rohe] and "Form Follows Function' is mere dogma until you realise the higher truth that form and function are one".

Cuddy, Lola, L. (1985). 'The Colour of Melody'. *Music Perception: An interdisciplinary journal*, Vol. 2, No. 3, Spring, pp. 345-360.

Danchev, Alex. (2011). *A Hundred Artists' Manifestos, From the Futurists to the Stuckists*. Penguin Classics.

Daugman, John. (2018). *Information Theory*. Department of Computer Science and Technology, University of Cambridge, Courses 2018-19. Available at: https://www.cl.cam.ac.uk/teaching/1819/InfoTheory. Accessed: 20.11.2018.

Daverson, Steven. (2014). *A Survivor's Guide to Hostile Structures: The Inception, Enforcement, and Confrontation of a Musical Dogma*. Doctor of Music, Composition, Partial Thesis. Royal College of Music.

An interesting self-study of, contradictorily (since Steven Daverson considers that he is breaking out from the mould), of how, typically, modern music colleges indoctrinate composition students with obsessive scoring detail and almost oppressive influence of modern composers held up as prototypes. In his battle to escape this he outlines some interesting mathematical procedures whilst still trying to keep some semblance of control. To elaborate, he uses fractal geometry, pitch class sets, expansion by a multiplier, rotation, ring modulation, what he calls collections and gradations and other devices even including an automatic 8 x 8 sudoku on-line resolver. Fibonacci numbers feature strongly, especially 5:3 and 3:2. This initially produced a crescendo at roughly two-thirds the way through. This became more refined with greater control as well as flexibility. He uses the procedures as a means of achieving what he would not be able to produce otherwise, whilst retaining the right to interfere as he sees fit. The net result is an original layered and lucid sound tapestry use of

instruments employed in a matrix of gestalt to phonetic and noise to sound as based upon Tarnopolski's bi-axial criteria and as measured against several leading modernists as well employing as a deconstructive method largely referential to Derrida and perhaps his favourite composer Brian Ferneyhough.

Daverson, Steven. (2019). *Schattenwanderer*. BBC Music. Steven Daverson & Nina Jansen-Deinzer & Ensemble Modern & Oswald Sallaberger.

Daylight, Russell. (2018) 'The difference between semiotics and semiology'. Available at: http://www.academia.edu/4771675. Accessed: 03.10.2018.

A succinct account of the difference between Saussure's semiology and Pierce's semiotics.

Design Curial. (2015). 'Deconstructivist Architecture – Eight Iconic Buildings', 03 February.

There are some potential sources of inspiration for writing music as based upon the sources here, one being the Vitra Design Museum in Weil am Rhein by Frank Gehry (although the picture of prosaic industrial buildings in the background for me let's down slightly—it is not the same as say modern and ancient architecture cheek by jowl in London, although there may be some sort of parallel here—it is like let's put award winning architecture in this spot because that's what the brief says, that's what the funding permits and the rest is incidental—it is like putting a jewel in amongst the pigsty—but, on another level pigs are marvellous and glorious creatures, so this argument falls down, because there is glory everywhere) and the exhibitions with political overtones are attention grabbing, particularly Sammlung Online and Stühle der Macht which indicate a balance between an almost obsessiveness for order on the cusp of disorder and disorder itself—which may speak for, in simplicity, OCDness and perhaps a power thing of say Foucault and totalitarianism (?)—somehow frightening and yet compulsively interesting and beautiful: the deliberate balance between order and disorder in the former and the completely clean regimented order of the other of the hermetically sealed speaking chamber, the place where democratic decisions are made.

Dillon, Joe. (2015). *The C-Theory*. Available at: http://www.thectheory.com/. Accessed: 12.03.2019.

Di Nunzio, Alex. (2013). 'Trevor Wishart'. *musicainformatica*, 22 June. Available at: http://www.musicainformatica.org/topics/trevor-wishart.php. Accessed: 12.12.2018.

Dimich, Caroline. (n.d.). *The Chemistry of Synesthesia*. Available at: http://www.chemistryislife.com/the-chemistry-of-synesthesia. Accessed: 06.12.2018.

A schoolgirl's account of her research into this subject. There is a disclaimer about the validity of students' work. Her basic thesis about serotonin makes sense and parts of the brain being linked in some way. She maintains that it is hereditary unless induces by hallucinogenic drugs.

Driver, F. (1988). 'Moral geographies: social science and the urban environment in mid-nineteenth century England'. *Transactions of the Institute of British Geographers*, pp. 275-287.

As recommended on Researchgate by Michael Uebel with regard to planning theory.

Duckles, Vincent et al. (2014). ‘Musicology’. *Grove Music Online*, 31 January.

Extensive survey of music covering periods under consideration in this research.

Dunleavy, Patrick. (2003). *Authoring a PhD, How to plan, draft, write and finish a doctoral thesis or dissertation*. New York: Palgrave Macmillan.

A comprehensive account of how to write and structure a thesis.

Dunsby, Jonathan. (2009). ‘Roland Barthes and the Grain of Panzéra’s voice’. *Journal of the Royal Musical Association*, 29 April, Vol. 134, Iss. 1, pp. 113-132.

This is quite an idiomatic critique of Barthes’s approach to the semiotics of phoneme and genome in a comparison between Panzéra and Dietrich where sometimes the argument seems specious even to be showing off. He ends by rhapsodising about Barthes. Perhaps this is all about somehow trying to impress his hero. Nonetheless he actually explicates ‘graininess’ well and gives insights in Kristeva’s place in this. He also comments upon musical meaning, citing Kramer’s *Musical Meaning*, which could be helpful in determining meaning during and or at the end of this research.

Duruflé, (1932). Maurice. *Suite, Op. 5 Prelude*. Recorded by Philippe Lefebvre, then titulaire, 1981, on IV/67/98 Danion-Gonzalez organ. Available at: https://www.youtube.com/watch?v=kpuAPizvBQI. Accessed: 29.11.2018.

Fabulous sound/ composition/ organ – surely if they ripped this out they would have replaced it with a better one? Some nice photographs indicating the sorts of details that Charles Jencks talks about ornamentation, tracery, stained glass.

Eder, Bruce. (2019). ‘Barrett, Richard’. *AllMusic*. Available at: https://www.allmusic.com/artist/richard-barrett-mn0000348315/biography. Accessed: 08.04.2019.

Eilouti, Buthanya, Hasan and Al-Jokhadar, Amer. (2007). ‘A Generative System for Mamluk Madrasa Form-Making’. *Nexus Network Journal*, January 9(1):7-29.

A generic way of designing architectural shapes for schools based upon Mamluk patterns.

Eisenman, Peter. (2018). ‘Famous Architects’. Available at: http://www.famous-architects.org/peter-eisenman. Accessed: 28.11.2018.

Ekshikaa. (2012). ‘12 Fun Facts about Tadao Ando’. Arch20. Available at: https://www.arch2o.com. Accessed: 30.11.2018.

New to me: a successful architect with no degree, has a way with people and concrete, is stubborn, and believes that ‘we are all in it together, a huge family whose responsibility is to care for each other. This is what makes us human.’ I agree. Interestingly, he seems to have a brand of architectural style all of his own called Critical Regionalism, which apparently lies halfway between Modernism and Postmodernism, ‘reflecting the culture of a region through its design and materials where aesthetic ornamentation is only applied in a meaningful way.’. He has a dog called Le Corbusier.

Enlightened. (2016). ‘How Building Technology Improves Productivity’. [Blog] Enlightened™, a Siemens Company, 30 August. Available at:

https://www.enlightedinc.com/blog/building-technology-improves-productivity. Accessed: 16.11.2018.

This website was recommended via Researchgate by Hussam Ali Mohammed and is valid as extending the notion of architecture, human considerations and of course the benefits of incorporating technology into design. Direct mention is made, also of acoustics and speech.

Esselier, Françoise and Ilić, Ivan. (2017). 'Morton Feldman: God is boring already'. *Limelight*, 11 January.

In a way this article is interesting. Morton picked up on this word and stated that he wasn't interested in 'interesting', which he held to be a European concern, but that he himself was more than interesting. The title of the piece shows, in my opinion, how religious Morton was/ is. His thesis was to make something out of nothing, which God has already done, is interesting, but, as it were, since it's already done, then what's left is to appreciate what's left in that creation, to Morton, Blaise Pascal, as an example. Then he distanced himself from the conceptual art of the Europeans, Boulez and Duchamp, whom he thought similar in this respect, featuring conceptuality, likewise Stockhausen. He likened himself to Cage, where, in this argument, they were, possibly, removed from the 'object', responding to a question of Ilić's where he referred to a conceptual artist who had said that they were thusly removed, where music was not causal, as perhaps Stockhausen had wanted, that it was all in the mind. A stance perhaps similar to Hildegaard of Bingen and Bridget Riley. 'Interesting' for Morton was something new. He stated that he thought that the Europeans were political, Marxist and anti-bourgeoisie, but still composed for the bourgeoisie. He thought that Cage was interested in theatre and surrounded himself with people, which seems true. Morton, on the other hand felt himself to be a loner. I think that Morton actually did like the company of people, was garrulous and whilst maintaining his pure stance to music actually was in real life quite theatrical himself. To what extent this then fed into his music one could have a nice debate about. Many of these points are relevant to my theory TFT. He was not anti-art but against 'false moralising', 'posing', such movements as Dadaism. He thought Stockhausen was a Dadaist.

Etherington, Rose. (2009). 'Brandhorst Museum by Sauerbruch Hutton' *Dezeen*, 16 February.

Etherington, Rose. (2008). 'CaixaForum Madrid by Herzog & de Meuron', Dezeen, 22 May.

Exarchos, Dimitris and Stamos, Yannis. (2008). 'Iannis Xenakis's writing and outside-time musical structures'. *Proceedings of the fourth conference on Interdisciplinary Musicology (CIM08)*, Thessaloniki, Greece, 3-6 July 2008.

Exarchos and Stamos synthesize Xenakis's, sometimes slightly varying yet largely consistent, views expressed in various writings on the subtle differences between outside- and inside-time in music, with a third mediating domain in between. The aim is for a functional musical analysis, rather than a philosophical one as such as of Bergson, although reference is made to Derrida. Xenakis sees time as heterogenous and composed of 'pure' time, metre, rhythm, external structure, internal time instants, scale as largely external, likewise melody and harmony, also symmetry and yet as with other elements there can be internal aspects, basically to do with the instaneity of time-becoming and space becoming. He debunks serial music and sets the ground for his sieve theory (as expounded in his *Formalised Music*—see elsewhere). He also has 'landmark points' which are analogous to my 'milestones' as in

Folkestone Bandstand, related to *nexus* points, possibly in a crude sense, yet in a way that I think is substantively valid. Xenakis is adamant that time cannot be reversed, that is pure time; fictional or constructed contrivances to do with time scales, series, intervals and so on can be reversed. I take issue with the fact that music dies as of the instant. Xenakis uses the idea of memory, of *trace*, yet I think this can be explored further and built up into a substantive system where music's evanescence can be shown to be as valid object-wise as any philosophical object, or indeed architectural artifice. My thoughts are similar to ponderings upon Deleuzian and Derridean differences, where a more consummate system of perspectives can produce more positive results, also, there may be straightforward psychological issues at play to do with time, memory and very short term memory to do with instants—this is worthy of further study.

Fallon-Ludwig, Sandra. (2014). 'Narrative inspiration in Liszt's symphonic poems: The cases of *Hunnenschlacht* and *Tasso, Lamento e Trionfo*'. *Academiai Kiadó*, 20 November.

Feldman, Morton. (n.d.). *Intersection 2*. Available at: http://en.scorser.com/Out/300578309.html. Accessed: 24.11.2018.

Fletcher, Banister. (1987). *A History of Architecture*. 19th edn, edited by Musgrove, John, London and Frome: Butler and Tanner.

Forrest, Elliott. (Presenter) (2010). 'Synesthesia, Scriabin and Seeing Music'. The Arts File on WQXR New York Public Radio, 22 October.

EF spoke to Daniel Livitin about synaesthesia and Scriabin and a forthcoming event of a light show accompanying Scriabin's music. DL has apparently written a book called *This is Your Brain on Music*. Given my opinion about the dearth of research on how composers' brains work, this might prove interesting (see separate entry).

SF-W argues that Liszt works out 'conflict and resolution' and 'suffering and redemption' partly via narrative or programme and partly by a musical expressiveness apparent only upon a deep analysis.

Foucault, Michel. (1969/1972). *The Archaeology of Knowledge*. Chaps. 1-3. Routledge.

Frank, Jon. (2013). CoLab 2013 Day 2, 07 March. Available at: http://jonfrankcolab2013.blogspot.com/2013/03/colab-2013-day-2.html. Accessed: 24.11.2018.

Franklin, Geraint and Harwood, Elain. Twentieth Century Society. Available at: https://theculturetrip.com/europe/united-kingdom/england/london/articles/take-a-tour-of-londons-most-iconic-postmodern-buildings. Accessed: 03.11.2018.

The picture of the Pumping Station was taken from here.

Franklin, Geraint. (Ed. Mayes, Deborah). (2017). *Post-Modern Architecture.* Historic England.

A document backing up their video (see below) and as such a useful and authoritative source on post-modern architecture.

Frearson, Amy. (2016). ‘Patrick Schumacher calls for social housing and public space to be scrapped’. Dezeen. 18 November.

Since Zaha Hadid died in 2016, PS has taken over running the architectural practice and has basically shown his colours to be hard right. See Schumacher.

Frescobaldi, Girolamo. (2018). *Encyclopaedia Britannica* (Eds.)

Friedman, J. (2017). ‘Two centuries of planning theory: An Overview’. In *Explorations in planning theory*, pp 10-29, Routledge.

Recommended by Michael Uebel via Researchgate regarding planning theory.

Fry, Hannah. (2016). *The Joy of Data*. [video]. Available from: https://ihavenotv.com/the-joy-of-data. Accessed: 20.11.2018.

Gabrielsson, Alf. (2016). ‘The Relationship between Musical Structure and Perceived Expression’, Chap. 14 in Hallam, S., Cross, I. And Thant, M. (Eds.). The Oxford Handbook of Music Psychology, 2nd edition. Oxford University Press.

Garland, Vaughn Whitney. (n.d.). *Adorno and Greenberg 1933to 1939*. [Unpublished]

Garland is a creditable academic: http://vaughngarland.com/Resume

Genkin, Daniel, Pattani, Mahir, Schuster, Roei and Tromer, Eran. (2018). ‘Synesthesia: Detecting Screen Content via Remote Acoustic Side Channels’. *Computer Science, Cryptography and Security*, 07 September.

This is the only result from a general search vis CCCU on line library search, which perhaps demonstrates the lack of research on synaesthesia. However, it is interesting that micro sounds are able to be picked whereby one can tell in a video conference if someone is going onto the internet whilst chatting and what site is being used. This perhaps has something to say about sensitivity of senses.

Gilmurray, Jono. (2018) ‘Ecoacoustics. Ecology and Environmentalism in Contemporary Music and Sound Art’. Available at: http://www.academia.edu/2701185/ECOACOUSTICS_Ecology_and_Environmentalism_in_Contemporary_Music_and_Sound_Art. Accessed: 05.11.2018.

` Gilmurray claims to assert the term ‘ecoacoustic’ (without hyphen) as preferential to ‘acoustic ecology’ or ‘soundscape composition’, as based primarily upon the work of David Monacchi and Matthew Burtner. He also mentions Barry Truax, R. Murray Schafer, Francis Dhomont, Hildegard Westercamp, Bernie Krause (of ANH, Acoustic Niche Hypothesis) — and Brian Pijanowski who studied ‘soundscape ecology’ as covering ‘acoustic ecology’, ‘soundscape composition’ and ‘biomuscology’, using natural sound recordings, deep listening [of which an early pioneer was Pauline Oliveros], spectrograms, some meddling with the sound to increase listening focus whilst preserving the natural sound and adding drones tuned into the harmonic series again to enhance the listener’s experience. Rather than idealising econature Monacchi prefers to integrate with it by using body with sensors attached fitting in with ecomusic. Gilmurray supplies a quotation of François-Bernard Mâché’s (1992: 190) (see below), which could be useful here as a reason for music with a new slant: to seek ‘outside man and his own musical conventions the source of a new music, which could be both an instrument of knowledge and intercessor of a harmony of the world’. Burtner, on the other

hand, uses natural sound and man-made music in counterpoint, together with sythesisations of instruments added into the sound mix, also, ‘acoustic ecological mapping’ or ‘sonification’ from spectrographic parameters of natural phenomena such as wind, or hydrophone recordings of ice layers, or dancers with sensors interacting to create turbulence in a computer representation of wind. Burtner also participates in EcoSono, a sound interventionist activist performance organisation. This source would be well worth revisiting when considering definitions and end aims of music. Other composers covered are: John Luther Adams, Leah Barclay, Walter Branchi, David Dunn, Andrea Polli and Douglas Quin.

Gibson, Eleanor. (2017). ‘Frank Lloyd Wright integrated architecture into nature at Fallingwater’, 07 June.

Glennie, Evelyn. BBC Radio 4. (2018). ‘The Rhythm of Life, The World as an Orchestra’, 28 August.

EG talks with Milton Mermikides who gave a lecture and recital at CCCU and with whom I corresponded by email via David Addlington. Being fascinated with rhythm she visits a car factory at Oxford to hear the industrial noises, discusses Bridget Riley with MM, discusses the architectural characteristic of Xenakis and talks with artist and composer Peter Adjaye about architecture in terms of rhythms, layers, light and so forth.

Goldberg, Mackenzie. (2018). ‘Patrick Schumacher sues for control over Zaha Hadid’s estate’. *Archinect News*. 15 November. Available at: https://archinect.com. Accessed: 16.11.2018.

Goodale, Mel and Milner, David. (2006). ‘One brain – two visual systems’. *The Psychologist*, November, Vol. 19, No. 11.

G and M outline the research development concerning the two main systems of ventral and dorsal sight, the former being predominantly concerned with recognition and the latter with action. Interestingly the ventral system seems to incorporate an ‘off-line’ short term memory and the thought occurs that possibly this could be a neurological explanation of Deleuze’s very short term time precognition—perhaps it is explainable by brain function rather than as an ontological phenomenon.

Gottlieb, Dylan. (2015). ‘Kimmel Center for the Performing Arts’. *The Encyclopedia of Greater Philadelphia*. Available at: https://philadelphiaencyclopedia.org/archive/kimmel-center-for-the-performing-arts. Accessed: 17.10.2018.

This will be used as the case study. Gottlieb has a PhD and seems to come from the area. This seems to me to typify some of the problems of architecture and auditoria even though the rescuing architect is Viñoly who still has a grandiose scheme, but cost overruns and the acoustic engineering was not gotten right at the outset and is still being put right. There will be obvious successes and this will need stating but to my knowledge there are not many venues that have gotten the acoustic design correctly from the outset—some churches have good acoustics, so maybe this is an area for further research.

Goudard, Vincent. (1918). ‘John, the Semi-Conductor: A Tool for Comprovisation’. *TENOR’18, Proceedings of the 4th International Conference on Technologies for Music Notation and Representation*, December.

A main relevance for me is the fact of discussing and working out a pragmatic way of handling how to get improvisers to take control whilst agreeing on a certain amount of pre-

determined information (composition) and then moreover to coordinate the players in an easily managed way during performance without detracting from the democratic participation and decision making. The screen browser called John is their answer. It may need some refinement but seems to work. For me the relevance of player participation is germane. I find it difficult to give directions to get players to take control. Ham's article (see below) illustrates the continuum of control between composer and player. I find that players want all the responsibility taken by the composer. This may well be something that I have to work on as an interpersonal skill. It may simply be due to practicalities of available rehearsal time. Perhaps I should consider designing an expedient that could facilitate more player participation. The score then would need explicit instructions even if alternatives are offered and to be clearly readable in a short amount of time.

Gover, Grant. (2017). *The influence of Music on Plant Growth*, Canterbury Christchurch University.

Guillaume du Fay. (2004). *Nuper Rosarum Flores*. On CD *Quadrivium* by Cantica Symphonia. Full sound source available at: https://archive.org/details/Dufay-NuperRosarumFlores. Accessed: 12.03.2019.

Graca, Herbert. (2017). 'Architectural Styles vs. Architectural Patterns vs. Design Patterns'. *Architecture, Development, Series. The Software Architecture Chronicles*, 28 July. Available at: https://herbertograca.com/2017/07/28/architectural-styles-vs-architectural-patterns-vs-design-patterns. Accessed: 26.03.2019.

Greene, Brian, Guth, Alan, Linde, Andrei and Bostrom, Nick. (2015). 'Infinite Worlds: A Journey through Parallel Universes', 18 March [video discussion]. Krulwich, Robert, Moderator. *World Science Festival*. Available at: https://www.youtube.com/watch?v=OO4uzgiRHkE. Accessed: 08.11.2018.

Discussion of string theory and many universes—some nice images, the graph that Brian Greene likes so much and one can see why—and some trio music by DJ Spooky showing that non-muzak type music can be inspired by parallel universes, as with Katrina Burton's Carr Chapel architecture.

Greg Lynn FORM. (2018). Available at: http://glform.com/bio-2. Accessed: 30.11.2018.

Greg Lynn FORM, *Sunnyside, Queens, New York City*, 1999. Available at: http://glform.com/buildings/korean-presbyterian-church-of-new-york. Accessed: 01.12.2018.

Grewe, Oliver, Nagel, Frederik, Kopiez, Reinhard and Altenmüller, Eckart. (2007). 'Emotions Over Time: Synchronicity and Development of Subjective, Physiological, and Facial Affective Reactions to Music'. *Emotion*, Vol. 9, No. 4, pp. 774-788.

Grimes, Nicole. (2017). 'Eduard Hanslick'. *Oxford Bibliographies*. Available at: http://www.oxfordbibliographies.com. Accessed: 15.11.2018.

An advocate of absolute music over programmatic music, hence against Wagner and Liszt, wrote the seminal *Vorn Musikalisch-Schönen: Ein Beitrag zur Revision der Ästhetik der Tonkunst* (1854) and various newspaper articles of leading composers of the day, thus, basically, starting the tradition of aesthetic criticism, although not comprehensively. As well as the absolute versus programme discussion, he started other 'binary' discussions: 'formalism/expression' and 'formalism criticism/hermeneutic criticism'.

Grooten, M. and Almond, R. E. A. (Eds.). (2018). *WWF Living Planet Report – 2018: Aiming Higher*. WWF, Gland, Switzerland.

Guberman, Daniel. A. (2015). 'Elliott Carter as (Anti-)Serial Composer'. *American Music*, Vol. 33, No. 1, Spring.

Hadid, Zaha. (n.d.). 'Transcendent Architecture'. Available at: https://designmuseum.org/designers/zaha-hadid. Accessed: 01.11.2018.

A full sane account of Zaha's life and work.

Hakoda, M. and Shiragami, N. 'Biseparation Engineering'. *Progress in Biotechnology*. 2000.

A technical paper on dielectrophoresis.

Hall, David. 'The Art of Visualising Music'. Available at: http://davidhall.io/visualising-music-graphic-scores. Accessed: 24.11.2018.

Hall, Tom. (2007). 'Notational Image, Transformation and the Grid in the Late Music of Morton Feldman'. *Current Issues in Music*, Vol. 1.

Ham, Jeremy, Joseph. (2018). 'Improvising Polyrhythmic Space: Exploring a Continuum of Music-Spatial Creative Practice'. PhD Thesis, RMIT university, December.

As an architect, academic lecturer and practicing drummer JH has articulated, experimented and presented at several conferences (once winning best presentation and runner-up on another occasion) on his evolved theory based upon drumming as a credible art form and occurring within a time frame where quick decision making is akin to "running a marathon while solving complex equations" as attributed to the drummer 'for the progressive rock band Rush' as cited in Hiatt (2015, p.48) and 'involving reaction times in the tens of milliseconds (Pressing, 1987)'. Polyrhythms come from beating two or more different time signatures together and are obtained by nine different techniques, citing Breithaupt (1987, p. 16): 'dynamics, tempo/rate of strokes, accents, 'space' (rests and rhythmic figures), double strokes/sticking patterns/hand-to-foot distribution, motion, special effects and random use of all elements'. Furthurmore, he posits this within an array of computerised mechanisms involving new notation, pre-recorded 'referents', 3D spatialisation and an interaction with virtual instrumentation and VR (Virtual Reality). The connection here with this research is a preoccupation with time and space, and architecture, of not just computerised architecture, but real-world architecture. The CAD which Ham uses and VR, ties up with corollaries of my TFT theory. In previous research (a copy requested via Researchgate 22.01.2019) Ham quotes Xenakis's view of time as subordinate to important elements such as melody being within time. Here, Ham seems to have reviewed this, since he places time as an inimical element of his music. Incidentally, he mentions tuned percussion in the context of drumming and music, although he defends, and I think quite rightly, that drumming can be considered musical from other aspects, such as storytelling, question and answer and use of grammar.
Another interesting point is his mention that a piece of drumming, albeit of micro size, can refer to something that happened minutes earlier. In this respect he cites Beck (2012, p.2)[1]. This very much ties in with my TFT theory where pieces of music can have direct

[1] Beck, T. (2012). "When the beat goes off: Errors in rhythm follow pattern, physicists find." Retrieved 29 March 2015 from http://news.harvard.edu/gazette/story/2012/07/when-the-beat-goes-off/.

relationship with other bits of the music than as in the immediate environs. He also mentions a field of possibilities of notes in improvisation, like Milton Mermikides's cloud of possibilities as based on Robbie Coltrane in his PhD (2010), which, again, ties in with my theory, TFT. There would be many other theories that similarly tie in, including the reference within this document in connection with colour theory (see Sandborn)—but, there will be many more still, such as in the fields of physics and other sciences, mathematics and even bona fide new age subjects, such as expostulated by Beverly Rubic (see above), also Deepak Chopra—many others. Another interesting assertion in connection with samples sold of Clyde Stubblefield, James Brown's drummer, where he incorporates minor amounts of lateness or latency in his beats, is that 'Imperfection is big business'. This implies that the human touch may be preferable over strict mechanical production of drumming, or music.

Hargrave, Joseph, Mistry, Radha and Wilson, Ralph. (2013). *It's Alive!* Can you imagine the *urban building of the future?* Foresight, Arup.

Heatherwick, Thomas. (2018). 'Manifesto: Towards a New Humanism in Architecture'. *The Futures City Project*. Available at: http://futurecities.org.uk. Accessed: 25.10.2018.

This includes a link to the manifesto calling for a new radicalism and wake-up call in architecture, virtually all of which is laudable, except, in my opinion, the belittling of sustainability. Sustainability does not need to be restrictive – it can be creative too. Will Alsop, one of my favourite architects, Jack Pringle, ex RIBA president, Amin Taha, architect, Mira Bar-Hillel of the Evening Standard, Denise Scott-Brown of Venturi Scott Brown and Associates and Kin Quazi of FLACQ architects all in one way or another approved this manifesto.

Hewett, Cecil, A. (1980). *English Historic Carpentry*. London and Chichester: Phillimore & Co. Ltd.

A prized possession. I think other textbooks have used the excellent illustrations.

Hewett, Ivan. (2011). 'Steven Daverson…New Faces'. *The Telegraph,* 26 May.

Heyden, Tom. (2014). 'The era of radical concrete'. *BBC News Magazine*, 10 September.

An excellent summary, with illustrations taken from Jimmy James's collection of the UK experiment in architecture, especially of housing, flats, high rise, garden cities, new towns, Brutalist architecture

Historic England. (2018). 'More is More: Post-Modern Architecture in England'. Available at: https://artsandculture.google.com/exhibit/zAICVj38saKzJg. Accessed: 03.11.2018.

Their choice of 17 of the best includes Charles Jencks' Thematic House, Chelsea (1979-85) in collaboration with Terry Farrell and others.

Historic Environment Scotland. (n.d.). *Craigs Bank, Craigsbank Parish Church (Church of Scotland) with Hall (including former Church),* LB48977. Available at: http://portal.historicenvironment.scot/designation/LB48977. Accessed: 13.12.2018.

The official historic website stating that the church is A listed, designed by Sir William Kininmonth, with a full description of the church, including some interesting Scottish terms, such as 'snecked sandstone rubble with stugged dressings'. I could not find

exactly what ‘stugged’ meant, possibly some sort of finish like ‘knapped’, striated, stippled, or ‘scabbled’. ‘Snecking’ is actually very interesting, a new one to me, and involves an arrangement of three courses of differently sized dressed, or roughly dressed, stone in sizes sort of reminding one of classical proportions, as outlined by Palladio or Calter (see above). With an extension to the original ‘Lorimerian’ 1937 church in 1954 and conversion to a hall in 1966 under Kininmonth as the architect, the church seems quite eccentric, together with a moat (that according to Burton did not work so was drained), various offshoots and the ‘conventicle’ design of the Liturgical movement.

Hodge, Chloe. (2014) ‘Form Follows Function’. *Aesthetica*, 18 November.

A synopsis of the architecture of Louis Khan (1901-1974) a sort of Nick Blake to the music industry parallel to architecture, influential and appreciated by those who know him, including Richard Rogers.

Hilferty, Robert. (2008). ‘Raphael Viñoly’s Musical Refuge’. *The New York Sun*, 10 June.

This is possibly the best source about Raphael Viñoly’s musical prowess. Whilst he states that musical composition is in a world of its own, he draws parallels between the two, architecture and composition. He may be one of the most musically centered architects in the world. He has at least 10 grand pianos, plays at an advanced level, was asked to play at the Albert hall, has his own concert hall, is friends with Daniel Barenboim, Alfred Brendel, Mitsuko Uchida, Mstislav Rostropovich, Martha Argerich and Maurizio Pollini, designed the Kimmel Center for the Philadelphia Orchestra and has designed opera sets (see Nowness reference).

Hobson, Ben. (2016). ‘Patrick Schumacher explains his future plans for Zaha Hadid Architects’ *Dezeen*, 19 July. Available from: https://www.dezeen.com/2016/07/19/video-interview-zaha-hadid-architects-future-business-plans-patrik-schumacher-movie. Accessed: 22.11.2018.

Holder, Rodney. (2013). *Big Bang, Big God, A Universe Designed for Life?* Oxford: Lion Hudson.

RH provides an argument for one universe, with a God creator as envisaged by Christianity, over multiverses, largely based on the concept of ‘fine tuning’ having logically analysed the current state of opinions and using Bayesian probability with a stunning figure of Roger Penrose of 1 in 10 to the power of 10 to the power of 123 as the probability in favour of our well-ordered ‘special, even extra special’ universe.

Holder, Rodney. (2012). *The Multiverse Fails*. 12 June [video]. Available at: https://www.youtube.com/watch?v=MBci7xSaFoE. Accessed: 08.11.2018.

Supports the later stated argument in the book above and from the comments obviously causes hot debate, including about M theory.

Honey. (2018). *Fisherman’s bridge (2008)*, 15 x 0.9m, Corten steel, concrete, slate. Available at: http://www.h-o-n-e-y.co.uk/architecture/fishermans-bridge. Accessed: 14.11.2018.

This is an absolute gift to this research, found via Gareth Leggeat at the architects Clagues, a totally charming bridge made from Corten steel, welded by a local blacksmith in

Hopkin, Owen. (2018). ‘Hildegard of Bingen: life and music of the great female composer’. Classic fm. Available at: https://www.classicfm.com/composers/bingen/guides/discovering-great-composers-hildegard-von-bingen. Accessed: 01.11.2018.

Horrigan-Kelly, Marcella, Millar, Michelle and Dowling, Maura. (2016). ‘Understanding the Key Tenets of Heidegger’s Philosophy for Interpretive Phenomenological Research’. *International Journal of Qualitative Methods*, 30 November.

Whilst directed at sociological research methods, the explication of Heidegger’s philosophy concerning *Dasein* and dasMan and other key terms is commendably lucid.

Horrocks-Hopayian, Cevanne. (2018). BBC, Cevanne Horrocks-Hopayian. Tracks: *Nightingale , you sing my sorrow* (Ziazan), *Ser (Love)* (BBC Singers, Conductor, James Morgan), *Muted Lines* (Emulsion Sinfonietta), *3 M’Lord* (BBC Music introducing in Suffolk 15.06.2013), *Stars and Stars* (BBC Music Introducing in Suffolk 24.08.2012).

A variety of styles and genres evident, from choral to ‘smooze’ (my word for sultry nightclub style) and rather attractive it is too..

Horrocks-Hopayian, Cevanne. (n.d.). British Music Collection. Available at: https://britishmusiccollection.org.uk/composer/cevanne-horrocks-hopayian. Accessed: 31.10.2018.

Although this source is undated it is chosen because it is linked to reliable institutions such as The Arts Council and it has links to two sources that I wish to use, an evocative recording of ‘The Swallow (movement III of ‘Khadambi’s House’ 2017), which being in line with this research, demonstrates her response to the architecture of the house in question, at 575 Wandsworth Road, London, in fact the bird artwork decorations – she uses a direct means of translating what she sees. She is also I think quite haptic. Her comments under the video are useful too. She uses ‘eye-music’ of which there is a nice example. In her comments she also mentions dance. Refer also to other websites at a later date for other information. Plus I attended a conference at CCCU at which she spoke and I talked to her in a tutorial. She definitely has her own ‘take’ on how to interpret architecture and aspects of it – see my definition.

Horrocks-Hopayian, Cevanne. (2017). *The Swallow*. Performed live at St, Luke’s LSO, 11 February, conductor John Hargreaves, for double bass, cello, viola and violin, singer.

Horrocks-Hopayian, Cevanne. (2018). *crewdson & cevanne*. Available at: https://www.cevanne.org/crewdson-cevanne-1. Accessed: 06.12.2018.

Huang, Weixin, Wu, Chenglin and Huang, Jiankun. (2017). ‘A Weaving Structure for Design and Construction of Organic Geometry’. *Proceedings of the IASS Symposium 2017I, “Interfaces: architecture.engineering.science”*, 25-28 September, Hamburg, Germany.

Based upon what looks like 3D CAD wire frame simulations, an algorithm for regularising mesh shape side lengths, extra calculations to obtain a starting material for strength of axial forces and bending moments and actual trial constructions using rods where intersections are worked out in 1D, they arrive at a reasonable proposition that ‘organic’

construction could be obtained this way. They debate whether this is fully organic yet, since they merely mimic organic structures, but it could lead to way via further research. They find problems with local forces possibly due to the curvature of the shell, possibly further related to the curvature of the rods themselves and other unexpected forces arising. This was obtained via Researchgate, where other similar research papers were evident in the same field. This is obviously a growing area of research and in fact resonates with research that I read about several years ago about a talk by Johansen (or some similar name) given at the Building Centre in Store Street, London and reported in the CIOB's magazine, the Construction Manager. His contention then was very prescient, stating that he could foresee buildings being built by digging a hole in the ground, throwing in a lot of materials, possibly nanomaterials, where some were instructions on how to assemble, with the rest being the building materials themselves, then the building self erects, forming largely rounded pod type shapes and then self-repairs as necessary. This paper was chosen as a representative sample of this current type od research. As for the musical outcome, it could possibly be that music is somehow worked out to represent the various rods in the system and where they join at the nodal points some way of working out the resultant forces as represented musically could be derived. This could lead to a musical system of perhaps quiet sections until a node is found, then a tightening of tension, then release. Of course, forces would be distributed around the system and along the so called quiet sections. This paper concludes that actual organic systems of for instance bamboo are better than say as using polypropylene, are flexible and could be more naturally efficient in distributing forces. They mention art forms. They did not mention it but Heatherwick's UK Pavilion, Shanghai, 2010, springs to mind as an example.

Huang, W. X., Yan, D., Luo, P. and Li, X. L. (2016). 'Digital Design and Construction of a Weaving Structure', December.

An earlier paper explaining the decision making and processes in the above in greater detail, also, explicitly citing Zaha Hadid and Frank Gehry in connection with the concept. They elaborate upon joint design, opting for a tied together system rather than fixed nodal points as used by Buckminster Fuller. This provides both friction and some freedom of movement, allowing some flexibility.

Hughes, Kerrie. (2018). '30 world-famous building to inspire you'. *Art,* 28 June. Available at: https://www.sydneyoperahouse.com/our-story/sydney-opera-house-history/utzon-resigns.html. Accessed: 01.11.2018.

Including The Lotus Temple, Bahá'í House of Worship, New Delhi.

Hugill, Andrew. (2005). *The Orchestra: A User's Manual, Clarinet*.

Hugill, Andrew. (2005). *The Orchestra: A User's Manual, Violin.*

Hurnaus, Hertha, Konrad, Benjamin and Novotny, Maik. (2007). *Eastmodern, Architecture and Design of the 1960s and 1970s in* Slovakia. New York: SpringerWein.

This is a rather fascinating account of Eastern architecture from the perspective of Slovakia and the Czech Republic of the 1960s and 1970s, largely dominated by Russian Realism and Communism in the Czech Republic and the Democrats in Slovakia. There were pockets of insights in modernism, post-modernism and other influences from America, for instance of Venturi and some glimpses of Italian architecture, but on the whole buildings were in line with state bureaucrats and "pressburgers", public opinion that resisted outright experimental building. Technological resources were restricted to an extent. Even materials were limited in supply, such as marble and tiles. Housing was largely of the 'Plattenbauten' type consisting of prefabricated concrete and 'shoddy residential developments'—which

Reinier de Graaf seemed to like—and then there were socialist projects that were high density high-rise that seemed to offer improved living conditions until Brigitte Reimann and Herman Henselmann questioned such mass production. This may well be similar in a way to the UK 1960s experiment with high-rise. There was a talk when post-modernism took hold of individual buildings relating to other building and 'urbanscape', which was a lesson learnt in the UK, since, to an extent, revoked with modern urbanism, basically an acceptance of rising population and a preoccupation with city life (witness Patrick Schumacher of Zaha Hadid Architects—see Frearson above).

Iddon, Martin. (2013). *Music since 1900: New Music at Darmstadt: Nono, Stockhausen, Cage and Boulez*. Cambridge: Cambridge University Press.

A seminal work on new music after WWII.

India Block. (2018). '10 key projects by Sydney Opera House architect Jørn Utzon', 09 April. Available at: https://www.dezeen.com/2018/04/09/ten-of-sydney-opera-house-architect-jorn-utzons-most-important-buildings. Accessed: 01.11.2018.

Including aerial view of the Sydney Opera House and Fallingwater by Frank Lloyd Wright.

Impett, Jonathan. (2008). *Making a mark: the psychology of composition*. In: Oxford handbook of music psychology. Hallam, Susan, Cross, Ian and Thaut, Michael, eds. Oxford Library of Psychology. Oxford University Press, Oxford, pp 403-412

Infoplease. (2018). 'Byzantine Music'. *The Columbia Electronic Encyclopedia,* 6th ed. Copyright © 2012, Columbia University Press. All rights reserved. Available at: https://www.infoplease.com/encyclopedia/arts/performing/music-history/byzantine-music. Accessed: 27.03.2019.

IPCC. (2018). Available at: https://www.ipcc.ch. Accessed: 30.11.2018.

Isaac. (2015). 'How to Transcribe an Interview for Dissertation – Parts 1 [and 2]'. *Weloty, Academic Transcription Services*, 21 May. Available at: https://weloty.com/how-to-transcribe-an-interview-for-dissertation-part-1. Accessed: 19.03.2019.

ISIT2018Vail. (2018). 'IEEE International Symposium on Information Theory', 17-22 June, Colorado, USA, hosted by IEEE Information Theory Society. Available at: https://www.isit2018.org. Accessed: 20.11.2018.

ITW. (2018). '2018 IEEE Information Theory Workshop Guangzhou', 25-29 November, General Chairs, Fan, Pingzhi, Aria, Nosratinia and Chen, li. Available at: http://www.itw2018.org. Accessed: 20.11.2018.

Jacobs, Jane. (1961/ 2002). *The Death and Life of Great American Cities*. New York: Random House.

A seminal book challenging the established planning procedures of American cities yet applicable across the world, advocating the promulgation of pavements, diverse life, street life, density not overcrowding, dwellings for rich and poor alike side by side, commerce, mixed aged buildings, short block lengths and, presciently, an encouragement of iterative non-linear organic growth and 'hop-skip' networks now known as 'small world networks'

(largely taken from comments from members of librarything.com). An architect lecturer friend of mine once had a course on urbanism authorised to go ahead with a reading list covering several sheets of paper and it is probably fair to say that this was the book that he was most excited about—I can see why. Where she mentions 'new urbanism' it surely is not the kind that is talked about today, which is a slick rich man's, or top-down out-of-touch civic, view. Where she criticised parks, she surely did not intend the doing away with green spaces as perhaps the extreme new urbanism of Patrick Schumacher. She merely, rightly, thought that the siting of some parks on the edges of cityscapes created unused and even dangerous areas. Where she would perhaps be critical of Garden Cities such as of Ebeneezer Howard, they perhaps are not all unsuccessful. Milton Keynes could be a useful case study of both pros and cons of this sort of highly planned scheme. She even commented upon cars, yet said that the doing away with them should be gradual. There have been attempts to instil her 'heart' (my word) into architecture and town planning, including collaborative projects with intended users, but these are spasmodic and need far-sighted planning authorities. Merton Borough Council is a good example and Bristol is another in using data to help drive planning decisions, including sorting out their patent traffic issues. Such data can help with planning for the complexity of modern life which is something that Jane Jacobs seems to have predicted. There may be a valid sexist element to Jane Jacobs' analysis in that the wholesale application of massive building projects may well be driven predominantly by men. Perhaps a simple solution to making mega projects more humane and 'human' could be to simply ensure a greater employment of female planners. Zaha Hadid, great as she was, may not be the best example of a feminine touch since she was mathematically and parametrically driven with a result of fabulous looking buildings in a post-modern futuristic vein, usable as per client briefs, yet perhaps without a certain 'heart'? How this is all relevant for interpreting music from architecture of building and cities, here, relates to the 'heart' of Jane Jacobs, the caring, nurturing element of sociology in architecture, as well as the benign aims of sustainability, which when interpreted in its widest ecological and politico-sociological meaning fits neatly with the aims of a compassionate life inducing and life affirming planning policy.

Jacobson, Howard. (2007). 'An afterthought of violence'. *The Guardian*, 11 October

This is the article that I alluded to below. I remembered the name. Have we got father and son together? If so, the son's account below is more straightforward, descriptive, although it does reference other people's reactions. This, the father's (?) is more grown up, pithy. Incidentally, I was listening to Max Bruch's Col Nidrei played by Gerald Moore and Jacqueline du Pré to the last one, and Jacqueline du Pré playing Bach's suites for solo cello Nos 1 & 2, then Brahms's Cello Sonata No. 1 in E minor, Op. 38: totally ideal! It is interesting how I remembered Howard Jacobson's article slightly differently to how it read on re-reading. He had the same experience in re-visiting the museum. It seemed clearer this time that he did understand all the symbolism in the museum, more than the younger version of that name, who nonetheless understood pretty well. It is unworthy to analyse too much. It does say something for architecture that it can move so much and with undoubtedly such a difficult subject.

Jacobson, Roddy. (2014). 'Berlin's Jewish Museum: Voids, memory, and Countermemorials'. *Academia* 15 December.

One of many, I dare say, reactions the German Jewish Museum in Berlin. One account I read which I cannot as yet re-find basically took Libeskind to task for confusing symbols and signs. To me at the time they did not seem so obfuscatory, but clearly in the line of trying to express something at what happened, windows at odd angles and so on, but here the symbolism is made very clear if not always agreed with, yet affecting generally. The main criticism in this article seems to be that the account is of loss but not offering any solution for the future. The voids seem to me to express a lot. Nothingness is talked about. This could be a

Germanic thing, Nietschean, yet it is like the other memorial covered elsewhere by Eisenman—there is nothing to say, no response—and yet there is…

Jaffé, Daniel. (2004). *Jonathan Harvey*. Available at: http://www.compositiontoday.com/articles/jonathan_harvey_interview.asp. Accessed: 13.12.2018.

Jonathan Harvey's views on music and selfhood are very interesting. Combining Christianity and Buddhism, and influenced by Stockhausen's 'analysis of the atomic structure of sounds' where 'he could rebuild a new musical universe', experience of Boulez, IRCAM and *musique concrète,* he is similar to Trevor Wishart and David Jaffe in morphing from real sounds to electronic. He is interested in the 'materiality of sound, in fact in a Buddhist sense of 'suchness'. This may, in a way, be similar to the interest of Katrina Burton in making music from architectural, sculptural and pictorial art materials. He also, made music from a bell in Winchester, *Mortuos Plango, Vivos Voco* (1980), where Katrina Burton evoked the bell in Craigsbank with simple notes from both high and low pitches.

Jaffe, David A. (2015). *David A. Jaffe, Biography*. Available at: https://www.davidajaffe.com/biography. Accessed: 13.12.2018.

Jaffé, Daniel. (2016). 'Tavener'. Interview with Peter Maxwell-Davies. BBC. *Contemporary Early Music*, Robert Searle. Available at: http://contemporaryearlymusic.blogspot.com/2016/08. Accessed: 12/030.2019.

Janson, Jonathan. (2018). Essential Vermeer 2.0, The Complete Interactive Vermeer Catalogue, Girl with a Pearl Earring. Available at: http://www.essentialvermeer.com. Accessed: 27.10.2018.

This is essential for my TFT because it is the one outside reference that I have brought in as an overt influence upon the model in question. There are of course others, in fact everything, an infinitely vast amount.

Janulytė, Justė. (n.d.) *Music Information Centre Lithuania*. Available at: http://www.mic.lt/en/database/classical/composers/janulyte. Accessed: 28.03.2019.

Jardim, Gilmar, Roberto. (2011). 'New York Skyline melody: an interpretive study in music composition of the Brazilian composer Heitor Villa-Lobos'. The São Paulo Research Foundation, FAFESP, Universidade de São Paulo .

Jencks, Charles. (2013) 'Architecture Becomes Music'. *Architectural Review*, (06) May. Vol. 233, Iss: 1395, pp91-108, 18p.

As a landscape gardener with a father who wrote pretty fine modernist music, Jencks has written a cogent article for the AR a respected leading thought provoking magazine in architectural circles. This is worthy of paraphrasing, summarising as an example of an approach to converting architecture to music as parametric or paradigmatic or metaphorical translation. To be fair even though I have weighed into St. Hill's diatribe (see below) with my own invective I think I aught to balance Jenck's claims with some countervailing argument of St. Hill's or at least to pick out the best salient points that I can find. The (06) represents the *AR* article with illustrations and the remainder represents the unillustrated academic version.

Jenkins, Simon. (2014). '100 Buildings, 100 Years Review – 'A battle between modernism and tradition''. Charlton, Susannah and Harwood, Elain, eds., Royal Academy. *The Guardian*, 12 November.

Buildings and architects extolled: 1920s Firestone Factory by Wallis, Gilbert and Partners, ‘a bravura work’, similar to Terry Farrell’s MI6 building and several other interesting choices of buildings and movements

Jerman, Igor & Krašovec, Rok & Leskovar, Robert. (2009). EVIDENCES FOR BIOFIELD. 173 - 190.

A technical explanation of the Biofield including Fritz Popp et al’s research.

Jones, Paul, R. (2006). ‘The Sociology of Architecture and the Politics of Building: The Discursive Construction of Ground Zero’. *Sociology*, June, Vol. 40, No. 3.

Jones describes the difficult to pin down political nature of buildings in connection with local culture and wider issues of nationhood and global images. He also describes the competing interest to invest buildings with meaning and debates, where possibly the most powerful voices get heard, about how to interpret buildings before, during the design stage, and after, sometimes (citing Bonta, 1979) shifting over time as with Mies van der Rohe’s 1929 Barcelona Expo Pavilion. He describes how architects, with an example of Daniel Libeskind and his Jewish Museum in Berlin and Freedom Tower in New York can become embroiled in public debate and can imbue meaning through their own agency and textual interpretation of their architecture which may not necessarily at first be apparent to casual observers. In this way the architect’s view can be imposed upon people’s interpretation. This can be seen as undemocratic. Jones cites Libeskind as quoted in the Observer (2003, 22 June): “discussion is part of the civic process. If people don’t discuss a building, they don’t care about it”. My note: this puts interpreting buildings musically into a different dimension and makes it difficult. (a) How can one interpret a political statement? It is possible—see, for example the work of Mathias Spahlinger, and (b) how to capture various and shifting opinions? The answer may be rather than a reductive or transliteration of a building a personalised statement is made as a response to the building. I am reluctant to call this a political response, but that may be what it is. There will be those who definitely will want to call it such and encourage this, because we live in an age, especially in contemporary music, where the political response is almost called for. To be honest, it is hard to live in the modern age without political awareness. Then when buildings are overtly political in one way or another, perhaps eliciting different interpretations, yet with overall political overtones, such as the Reichstag renovation by Norman Foster or Daniel Libeskind’s Jewish Museum and Freedom Tower, then it is difficult to not respond in some political way. So, picking up on the earlier point, perhaps the answer is to be satisfied with an individualistic approach and then more than be satisfied with it, revel in it, making it a really personal statement with full conviction and commitment.

Kelly-Gadol, Joan. (2018). ‘Leon Battista Alberti, Italian Architect and Author’. *Encylopædia Britannica*.

Ker, Dorothy. (2016). *String Taxonomy*, NZTrio, Justine Cormack, violin, Ashley brown, cello, Sarah Watkins, piano, Xia Jing, guzheng, 16 September, Adam Concert Room, Te Kōkī New Zealand School of Music. Available at: https://www.youtube.com/watch?v=B62Kzbg1dqk. Accessed: 09.11.2018.

Effective quiet piece using advanced techniques with some authentic Koto/ guzheng sound.

Kelly, Rachel. (1999). ‘The Building, “Oxford’s most intimate music venue”’. *JdP*. Available at: https://jdp.st-hildas.ox.ac.uk/about/the-building. Accessed: 14.12.2018.

KSUM. (2019). ‘Fashion Timeline’. *Kent State University Museum*. Available at: https://www.tiki-toki.com/timeline/entry/36164/Fashion-Timeline/#vars!date=1782-07-02_19:47:49! Accessed: 28.03.2019.

Ker, Dorothy. (2015). *Snake, Echo & Beetles*. Rangi Ruru Girls’ school, Charlton, Helen, conductor, The Big Sing, Michael Fowler Centre, Wellington, New Zealand, 21 August. https://www.youtube.com/watch?v=DOo1amKyoc0. Accessed: 09.11.2018.

Three miniature vocal pieces sung with obvious enthusiasm and control; the first, syncopated, with tuned wood block, repetitive rhythm, possibly drawing from indigenous Maori culture; the second, could be a piece worthy of Sir Peter Maxwell Davies or Benjamin Britain, using simple yet unusual harmonies, repetition, echo effect, round form; the last piece, again with repetitive rhythm, some polyrhythm in miniature and minor crescendo. All pieces ended abruptly which added to the dramatic effect like a miniature perfect essay.
An interesting point is that there was only one comment, quoted in full, because it is symptomatic of the divide between classical and contemporary music, which I find to be still clear cut. Those well into musical circles like contemporary, those outside of it tend to prefer the usual canon. Peter Schulze (2016) said: ‘Hm, I have my difficulties with modern pieces. Not sure what to make of this. Not sure if I like it or not. But besides that: Great performance, thanks.’ Possibly New Zealand is still fairly conservative in its tastes and yet one knows of many adventurous and exciting composers from that region, possibly more so from Australia. This website highlights some NZ composers, although, whilst there are plainly some serious modern composers, the majority seem to be of popular appeal: https://www.ranker.com/list/famous-composers-from-new-zealand/reference (accessed: 09.11.2018). This website highlights some Australian composers, including Elena Katz-Chernin, yet missing Anne Boyd: https://www.limelightmagazine.com.au/features/australias-10-greatest-composers. (accessed: 9.11.2018).

Kieffer, John. ‘Elements of Information Theory. By Thomas M, Cover: Joy A. Thomas. *Siam Review*, Vol. 36, No. 3 (Sep,. 1994), pp. 509-511.

This substantiates the setting of this book by Daugman as the essential textbook. Firstly, Claude Shannon’s work on information transmittance is set as foundational. Interestingly, this is for the following fields: ‘electrical engineering, computer science, physics, mathematics, and economics’. No mention of wider applications, such as cosmology, but physics could sort of cover this. In my TFT theory it is difficult to distinguish between the two. Entropy, with equalities and inequalities, is covered, The Shannon-Macmillan theorem, where *The Free Dictionary* cites the Shannon-McMillan-Breiman theorem as: ‘Given an ergodic measure preserving transformation T on a probability space and a finite partition ζ of that space the limit as $n \to \infty$ of $1/n$ times the information function of the common refinement of ζ, $T^{-1}\zeta$, …, $T^{-n+1}\zeta$ converges almost everywhere and in the L_1 metric to the entropy of T given ζ’ (McGraw-Hill Dictionary of Scientific & Technical Terms, 6E, Copyright © 2003 by The McGraw-Hill Companies, Inc.)
Interesting also in the online searching coming across ‘Julia’ and Mandelbrot sets, Jacobi forms, Maass wave forms, Riemann transformations, Banach space and more—all would come within the TFT. Continuing what’s in this book: various coding theories about cutting down information loss, compression, Kolmogorov complexity, algorithmic versus usual model-based coding, block codes, channel capacity, spectral densities and Burg’s maximum entropy theorem, information theory statistics, boundary theories, distortion rates and network information theory. All of these points relate to this research regarding a two-way dialogue between architecture and music. This is in a specifically scientific way, basically, all relating to the pathfinding work of Claude Shannon. But, also, included, if not directly, then by inference—although the TFT would implicate all communication to be conjoined, to be all within the one set of communication—is all the softer management theory (as indicated by this website: http://valuebasedmanagement.net (there are more), psychological and sociological (including cultural) communication.

Kieth, M. and Pile, S, (Eds.). (2004). *Place and Politics of Identity*. Routledge.

Recommended by Michael Uebel via Researchgate in connection with planning theory. It is interesting to see the significant topic of identity covered.

Klewitz, Ralph. (2013). 'World Signs: Symbols without Meaning'. *Typography Day 2013*. 08 March. DoD, IIT, Guwahati.

This paper outlines Klewitz's experiment in adapting font creatively, coupling with photography, then allying with music upon the suggestion of a student of his, Chang Oh. The sample of images in the paper show how patterns similar to, say, Bridget Riley and Daniel Libeskind's musical sketches can be translated into music. In this instance, Klewitz went on a dedicated course and gained assistance from three staff members, Daniel Weissberg, the musician, Hans Rudolf Reust, an art critic and René Pulfer for his knowledge of 'time based media practices in fine arts'.

Kontraklang, ensemble. (2018). *Musik-Macht-Staat*. [Video]. Eva Leitner (Gesang), Margit Eilmannsberger (Flöte), Iris Shiloing Moldiz (Klavier), Waltraud Krenn (Resitation), Norbert Asen (Klarinette und Saxaphon), Walter Krenn (Klarinette), Rudi Mangst (Tontechnik). Available at: https://www.youtube.com/watch?v=69yyjJ7LOmU. Accessed: 30.11.2018.

Run by Christopher Williams.

Korsyn, Kevin. (2003). *Decentring Music: A Critique of Contemporary Music Research*. Oxford: Oxford University Press.

Two points: he describes the signified as being a starting point thus obviating the Saussurian problem of difference; he has a very neat explanation of different time interpretations of a few bars of Strauss's *Der Fledermous* as measured to 1000's of a second.

Kozlowski, Miroslaw and Marcia-Kozlowska, Marcia. (n.d.) 'The Possible Source of the UHECR Observed in the AGASA Experiment', Institute of Electron Technology, Al. Lotników 32/46, 02-668 Warsaw, Poland.

The authors argue that ultra-high energy cosmic rays can produce particles exhibiting speeds beyond the standard speed of light.

Lanzilotti, Anne, Victoria, Leilehua. (2016). 'Andrew Norman's *The Companion Guide to Rome*: influence of Architecture and Visual Art on Composition', May. Available at: https://search.proquest.com/docview/1847569458?fromunauthdoc=true. Accessed: 05.04.2019.

LDN Architects. (2018). *Craigsbank Church*. Available at: https://www.ldn.co.uk/architecture-projects/craigsbank-church. Accessed: 13.12.2018.

Obviously a repair specification for the original works in 1966 which detracts a bit from the glamour, having to use a modified polymer reinforced render over 'dissimilar surfaces' to keep the planar look, new jointed and gasketed metal wall cappings set flush (a bit like the Carr Chapel in this detail), and a single ply PVC roof membrane, which, possibly replaced Nuralite sheeting (see Historic Environment Scotland), which had a vogue as a roofing membrane at one time. Clerestory windows and rooflights were replaced by modern

equivalents. All this sounds sensible yet it takes away a bit from the mystique. There are also some useful photographs of the bell tower which comes into Katrina Burton's composition.

LeGates, R. T. and Stout, F. (Eds.). (2015). *The city reader*. Routledge.

As recommended by Michael Uebel via Researchgate for planning theory.

Leng, Andrew. (2001). 'Letters to Workmen? Fors Clavigera, Whistler vs Ruskin and Sage Criticism in Crisis'. *Prose Studies*, April, 24(1), 63-92.

About the feud between Ruskin and Whistler perhaps showing Ruskin's less tolerant side although he was probably standing up for his friend J.W.M. Turner. I personally rate Whistler's painting as marvellous.

Lennox, John, Craig, William Lane, Moreland, J. P. (2015). *The Multiverse, God, Science*. [video discussion] Available at: https://www.youtube.com/watch?v=B-tcHTkmG8g. Accessed: 08.11.2018.

Lewis, Matt. (2018). (interview)

Interview projected for 14 November at RCA White City London. In fact, carried out on 10 December 2018 at Margate. See Appendix B.

Wide ranging debate solidifying and clarifying opinions on multiverses, monotheism and other issues. Where multiverses seem to be equated with atheism sometimes, it is nice to see Craig aver that that is not necessarily so.

Levitin, Daniel. (2006). *This is Your Brain on Music: Understanding a Human Obsession*. London: Atlantic Books.

Hoping for a really insightful book on how the brain of a composer works, this book is partly populist and yet partly insightful and clearly informative with two simple diagrams of the human brain, some clear simple harmonic explanation. Some interesting insight from his sound engineer recording experience.

Libeskind, Daniel. (1983). *Chamber Works*. Head of Architecture 28 drawings, Department of Cranbrook Academy of Art, Bloomfield Hills, Michigan, USA.

Libeskind, Daniel. (2014). 'Daniel Libeskind: "I Never Had a Goal". *The Talks*, 07 March.

As with Raphael Viñoly, Daniel Libeskind started in music - and I heard on Desert Island Discs (see BBC reference) that he listened especially to Mozart when designing – Viñoly also has an admiration for Mozart.

Libeskind, Daniel. (2002). 'Daniel Libeskind: The links between music and architecture'. BBC Proms talk, 29 July.

This seems very pertinent to my argument, (a) because he is one of my best exponents in this thesis, and (b) because having now studied and re-studied quite a few architects and their architecture, I come back to Daniel, as, I think, my favourite architect. There are others Edwin Lutyens, I. M Pei, Peter Zumthor, Will Alsop, Jeanne Gang looks interesting, South American and Asian architects. He has the same style as say Zaha Hadid, Frank Gehry, Bernard Tschumi, Rem Koolhaas and Richard Meier to literally name but a few.

His argument is that both music and architecture are ‘disciplines’ in the sense that one needs strict discipline to successfully execute them, musically to get right the ‘melody’, accurately play notes, get the ‘tempo’ correct and let the’ harmony’ be interpreted. Also, there are common elements of ‘time’, and ‘mathematics’ that need precision to work, both for architectural drawings as well as musical scores. He thinks a disparity is in ‘rotating’ players, getting their involvement, where the onus of getting it right in say structural detailing cannot be assigned to just anyone. There is an argument of involving members of the public, users, future occupiers in design, for instance in the North of England where early collaboration brought down crime and graffiti. Residents bought into their projects with some ownership, voice and feeling of democratic worth, or something like that. From my experience of teaching the more one cedes power to individuals the more they surprise you with what they can do—but some of DL’s designs are so complicated that I take his point, He would rather have experts on board and probably rightly so. He did win the Twin Towers re-build competition but it was so politically charged that like Zaha Hadid who won the Cardiff Bay Opera House, but because she was a woman and maybe due to her nationality (probably the feminist point), that they were both denied their rightful realisations of these projects. In this scheme, which I followed at the time, I thought his was the best and he certainly considered people in his design, as he did for say the German Jewish Museum (which incidentally bears scrutiny for all sorts of hidden and less hidden symbols and Barthesian and others’ signs). Anyway, his designs are impeccable, terse, clever, but not ostentatiously, concise, full of meaning, not just flamboyant. Very exciting, admirable as very fine art, cultured, yet completely honest. He is at the top of the pile for this sheer ability and truthfulness. I wonder how much then music plays a part in this stand-out quality.

Ligeti, György (1923-2006): String Quartet No.2 (1968) *Quatuor à cordes* No. 2, I Allegro nervoso, II Sostenuto, molto calmo, III Come un meccanismo di precisione, IV Presto furioso, brutale, tumultuoso, V Allegro con delicatezza, Arditti quartet.

Link, John, F. (1994). ‘The Composition of Elliott Carter’s Night Fantasies’. *Sonus*, 14 No. 2.

Logos. (2018). (Eds.). *Encylopædia Britannica*. Available at: https://www.britannica.com/topic/logos. Accessed: 23.11.2018.

From a search for the philological or linguistic technical word for ‘word’ as functioning ordinarily in language, I could not find the word that I was looking for, something ending in ~eme, like phoneme, but not that word. I decided to use the ancient Greek word, translated in English as *logos*. I knew from having studied ancient Greek at school that the plural was *logoi*, then having looked up EB the definition was related to the biblical meaning of Christ and God. As a Christian I am happy, more than, with this, since it imbues the word with a heavenly blessing, even though in this context I am wanting to somehow differentiate the word for ‘word’ in common language with some other word. The ancient Greek word seems perfect here. EB do state that one meaning for *logos* is ‘word’ and that the plural is *logoi.*

Louzeiro, Pedro. (2017). ‘The Compravisador’s Real-Time Notation Interface’. Proc. of the 13th International Symposium on CMMR, Matosinhos, Portugal, 25-28 September.

In a way, this explains a typical modern electronic set-up where improvisors can feed back their recorded sounds to a computer or set of computers, undergo some algorithmic manipulation coupled with some predetermined parameters, then an electronic score for players can be produced, considering variations of numbers of players and instrument characteristics such as range, clef and string tunings. Over several improvisatory set-ups refinements were made to software messaging, synchronisation, concentration on harmony

and melodic contour, also methods of clearly showing the score—one interesting feature was to show dynamics in 3D against a coloured background and where by default either a 'cresc.' or 'dim' showed which assisted players' rapid reading. Separation or integration of players' information is possible to create different tempi, notes and different positions in loops, or synchronisation.

Lubel, Sam. (2016). 'Meet Patrick Schumacher, Zaha Hadid's ambitious, abrasive successor'. *Wired*, 26 October. Available at: https://www.wired.com. Accessed: 16.11.2018.

Within this article is an up to date definition of parametricism as used by PS and other modern architects where the liquid flow form of building is designed using data fed into the algorithms helping to design the buildings, including 'environmental parameters, sun, wind, gravity and geology.'— and 'gravity load tests'. PS takes this one step further calling it parametricism model 2.0 which he sees as a blueprint for all architects and to incorporate in SL's words 'human factors like productivity, social interaction, culture, and well-being that detractors say Hadid ignored.'. In some ways it may be the other way around (my thoughts). He takes crowd engineering further, for instance in Moscow's Sberbank head office, with thousands of interactions calculated to shape corridors and meeting places around the 'grand atrium'. PS wants a 'lawfully scripted order' doing away with 'a plurality of designs' and 'garbage-spill urbanization'. According to SL, PS wants to become 'the Corbusier, Mies van der Rohe, or Walter Gropius for the digital age.'. PS says he is 'thinking larger' and that he is 'thinking of making history, in fact'.

Lucy, Charles. E. H. Extract from *Pitch, Pi and other musical paradoxes……..* Chapter Nine, Pitch, Colour, Scriabin, and others. © 1986-2000. Available from: www.harmonics.com/lucy/lsd/colors.html. Accessed: 05.12. 2018.

Lynn, Greg. (2013). *Bio & Resume*, 03 December. Available at: https://admin.arch.ethz.ch/vortragsreihe/pdf/CV_Lynn.pdf. Accessed: 01.12.2018.

Lynn, Greg. (2005). *Organic algorithms in architecture*. Ted Talk, February. Available at: https://www.ted.com/talks/greg_lynn_on_organic_design. Accessed 30.11.2018.

New to me: he eschews classical proportioning, numbers such as 5 and 7, for instance as the nose to the face and the head to the body and other proportions such as rooms 1: 4 and uses constantly changing proportions, based on calculus and decimalised fractions to create a new way of allowing vectoral and individualised movement using computers. One change will have a knock-on effect throughout the system and will be calculated automatically. This can affect massing and interrelated elements such as colour, shape and other elements, for instance, structure, windows and so on. Another important feature is the idea that symmetry is no longer seen as beautiful but rather a sign that something has gone wrong. This is used to create new forms, called 'symmetry breaking'. This comes from William Bateson's idea of 1894 which Lynn resurrected in The Renewed Novelty of Symmetry in 1995. The science is called tetralogy and it is to do with genetics where 'traits' are recombined instead of 'ideals' which involves typology. He has collaborated with Bentley and Microstation on the programming of the integrated calculations for components. His example was for a horizontal lift that was supported by 122 trusses where each had a differently designed shape and for each connection millions of calculations were carried out and then, as it were, joined up as one so that any change would automatically trigger the appropriate changes in all the other connections. He said that the decimal point was invented in the 15th Century and that thereafter this sort of calculation could be taken into account and he said that this really started with the Gothic period although they were not fully aware of this. But they did think of 'force and motion in terms of form' for the first time. So, this was evident in Sir

Christopher Wren's ribbed vaulting (and Jencks's cathedral examples too), much later in Robert Meier's bridges which optimised the structural form using calculus with the example shown having almost a parabola, Antonio Gaudi' 'hanging chain models' becoming 'archways and vaulting' and so on. He ends by saying that he invested in CNC and laser cutting equipment where texture could be added, thereby 'texture, form and material' can fuse into one. Material used are plastic and fibreglass. Steel which could also be used and be very efficiently integrated.

Lynn, Greg. (1995). *The Renewed Novelty of Symmetry*. Assemblage, 26 April.

In this article Greg Lynn runs through Bateson's idea of "essential diversity" as opposed to Darwin's "random mutation" and "discontinuous variation" instead of Darwin's "gradualism". The natural state is entopic symmetry and homogeneity. Genes cause breaks in the symmetry which makes the state go heterogeneous. The genes are specific in what they cause but otherwise conditions are general. My note: this is similar to man's intervention with architecture and building which goes against the natural entropy. It is further interesting that the universe tends towards entropy, and simplicity but at all threshold events in 'big history' complexity arises (from where?). I think we are doing the same thing with our drive to build, create cities, super cities, cities of the future, all the urbanisation that is both wanted and not!—except for people like Patrick Schumacher who advocated rampant urbanisation. There are other who are less extreme in their expression of this. Note: the Arup think tank that predicted super cities—but, a big but, sustainable ones, as per the model shown above. Also, one of my favourite architects, Will Alsop wanted super highways connected with super cities, essentially the super highway being in effect one bid super highway. One such highway was advocated from Liverpool to Hull. Additionally, he wanted as it were super blocks of flats on canted stilt supports, a trademark of his—and Zaha Hadid. Lynn uses this concept in his architecture. It obviously works, but at a straightforward subjective level it does not work for me. When I told my wife, she said that the heart is missing. She continued along the lines of : if using computers somewhere along the line human intervention is needed. I agreed—and anyway this I think happens as stated elsewhere with nominally aleatoric music. The same goes for music as for architecture: if total computerisation is allowed for in design then something is missing. This amounts to the Ada Lovelace and Alan Turing effect, or simply called the Turing Effect. This is another large debate. I personally think computers will advance to such a state as to be compatible with humans, outstrip humans in many ways and in the end be so sophisticated as to need 'rights' in the same way that humans do. We are not there yet.

Macalester. (n.d.). *Synaesthesia and the Brain*. Available at: https://www.macalester.edu/projects/UBNRP/synesthesia/SYNBRA~1.HTM. Accessed: 06.12.2018.

Not being dated gives cause to not rely fully upon the findings, although it is fairly well written and seems authoritative. Anyway, these findings are essentially to do with brain functions and connection rather than specific chemicals, more neuron and pathway centred.

Mâché, François-Bernard. (1992). *Music, Myth and Nature, or The Dolphins of Arion*. (trans. Delaney, S.). Reading: Harwood Academic.

Malevich, Kazimir, Severinovich. (2002). *Complete Works*. Available at: http://www.kazimir-malevich.org. Accessed: 07.02.2019.

Manaris, Bill, Roos, Patrick, Machado, Penousal, Krehbiel, Dwight, Pellicoro, Luca and Romero, Juan. (2007). 'A Corpus-based Hybrid Approach to Music Analysis and Composition'. *Proceedings of Twenty-Second Conference on Artificial Intelligence (AAAI-07), Vancouver, BC*, July 2007.

Whilst, personally, being sceptical of computer generated music, this is an accomplished piece of academic work using artificially generated 'critics' as compared with real people, gaining on the whole significant results for existing music, then their own music as based upon a piece by Bach. Deficiencies in the approach are in using popular and pleasantness comparators, genetic material from the original and features, though possessing elements of randomness, that would not, in my opinion, lead to true originality, although they do not make claims for a means of creating great music, rather as an aid for composers and more as a means of obtaining music of similar likability from libraries thus aiding retrieval.

Margarint, Alexandra. (2015). 'Adam Hodgkins in SightandSound Magazine'. *University of Light Detail Composition Westminster*, 20 May. Available at: http://blog.westminster.ac.uk/cmp/2015/05/adam-hodgkins-in-sightsound-magazine. Accessed: 02.03.2019.

Mark. (2007). 'Eduard François, Architecte, Fouquet's Barrière, Paris, France, 2006'. *Architonic*, June.

Maus, Fred, E.' What Was Critical Musicology?' in Special Issue: 'What Was, or Is, Critical Musicology'. *Radical Musicology*. ISSN 1751-7788, pars. 1-20. Available at: http://www.radical-musicology.org.uk/special_critmus/maus.htm. Accessed: 23.11.2018.

A whistlestop tour in 20 para graphs of twentieth century's account of musicology, from traditional analytical based criticism of say Tovey to new musicology and new music criticism, taking in subjective, identity, 'queer music', historical, ethnographic, cultural, literature-based issues, skirting around mathematical and scientific approaches generated by Milton Babbitt (my note: although recently there is a growing trend of empirical research in many areas including subjective areas of psychology and sociology, what makes music and its useful effect) ending by encompassing pop music and wider critiques from those outside traditional academic circles. As an aside, I like Shepherd's (not mentioned here) detailed critique of modern day culture and its place in music which for me is accurate.

Macleod, Donald. (2017). *Soviet Russia (1953-1991)*. BBC. Composer of the Week, 17 November. Available at: https://www.bbc.co.uk/music/artists/fc69035e-f525-4648-9089-5943db021fc5. Accessed: 02.04.2019.

McKay, Nick. (2017). *Analysis* [lecture] on topic theory, semiotics, Stravinsky and Mozart, Maxwell Davies Building, MDf07.

Medina, Sammy. (2013). 'The A-To-Zaha List: 7 of Hadid's Best Buildings'. *Fastcompany*, 08 August. Available at: https://www.fastcompany.com/1673188/the-a-to-zaha-list-7-of-hadids-best-buildings. Accessed: 01.11.2018.

One of the best very succinct accounts with analysis of Zaha Hadid's architectural style.

Mermikides, Milton. (2010). 'Changes Over Time: Theory, the theoretical modelling analysis and redeployment of jazz improvisational, and time feel mechanisms'. Partial PhD submission in composition. University of Surrey. Available at: http://www.miltonline.com/category/composition/page/2/. Accessed: 06.12.2018.

Much in here to endorse my theory TFT.

Mermikides, Milton. (2018). *Data Sonification*. 22 November. Available at: http://www.miltonline.com/category/data-sonification. Accessed: 06.12.2018.

Mermikides, Milton. (2014). 'New York Skyline Melody Visualised'. miltonline mermikides, Hidden Music milton mermikides. http://www.miltonline.com/category/composition/page/2. Accessed: 06.12.2018.

Metcalfe, Tom. (2016). 'What's That Noise? 11 Strange and Mysterious Sounds on Earth & Beyond'. *Live Science*, 20 October.

Includes findings of X-Ray researchers at Cambridge university finding that a super-massive black hole in the constellation of Perseus has a Bb note 57 octaves below Middle C and is probably the 'lowest note in the universe' playing for about 2 billion years, 'the longest lasting symphony that we know of'.

MET Office. (2018). Available at: https://www.metoffice.gov.uk/climate-guide. Accessed: 30.11.2018.

Mills, Peter. (2012). *Media and Popular Music*. Edinburgh: Edinburgh University Press.

MoMA learning. (2018). Andy Warhol (1928-1987), *Campbell's Soup Cans*, 1962. Available at: https://www.moma.org/learn/moma_learning/andy-warhol-campbells-soup-cans-1962 and https://www.moma.org/audio/playlist/1/531 Accessed: 12.11.2018.

Monk, Meredith. (1981). *Ellis Island*. [film]. Available at: https://www.youtube.com/watch?v=oS9wOlkSzQk&feature=youtu.be. Accessed: 23.01.2019.

Mohr-Pietsch. (2015). 'Rebecca Saunders'. BBC Radio 3's *Composers' Rooms*, 17 January.

Monk, Meredith. (1988). *Book of Days*. [film]. Available at: https://www.dropbox.com/s/gyk5sbbs46cfhlm/Book%20of%20Days.mp4?dl=0. Accessed: 23.01.2019.

Morris, Keegan. (2018). 'Hear music inspired by some of Chicago's most extraordinary buildings'. *wfmt*, 07 September. Available at: https://www.wfmt.com/2018/09/07/hear-music-inspired-by-some-of-chicagos-most-extraordinary-buildings. Last Accessed: 16.10.2018.

Murphy, Patrick. (2013). *Extended Techniques for Saxophone, An Approach Through Musical Examples*. Partial fulfilment of doctorate. Arizona State University. Available at: https://repository.asu.edu/attachments/110385/content/Murphy_asu_0010E_12819.pdf. Accessed: 14.03.2019.

Murray, Christine. (2015). 'AR Issues: Has Architecture Lost its Social Conscience?', *ArchDaily*, 20 July. Available at: https://www.archdaily.com/770250/ar-issues-has-architecture-lost-its-social-conscience. Accessed: 23.10.2018.

This is a plea for architects to rediscover their social consciences as with some South American projects.

Nagel, Jody. (2004). 'Concerning Serial Rotations in Stravinsky's Variations'. Texas Society of Music Theory, originally delivered March 1987, revised 01-03 October.

Nepil, Hannah. (2018). 'Roxanna Panufnik: I have the courage to do what I want'. *Financial Times*, 19 April.

In this interview Roxanna admitted that she has synaesthesia. I have heard this before possibly on Facebook being one of her friends.

Nguma, Samuel. (2018). '40 Most Famous Architects of the 21st Century'. *Archute*. Available at: https://www.archute.com/2015/08/03/40-famous-architects-of-the-21st-century. Accessed: 27.11.2018.

Nielinger-Vakil, Carolina. (2016). *Luigi Nono: A Composer in Context (Music since 1900)*. Cambridge: Cambridge University Press.

An undoubted expert on Nono, his methods of composing using serial techniques, magic squares, his strong political commitment, innovative theatricality and use of tapes.

Norfolk Stained Glass. (n.d.) Available at: http://norfolkstainedglass.co.uk/Cathedral/home.shtm. Accessed: 31.10.2018.

An interactive site with invaluable information about the stained glass in Norwich cathedral, including the West window.

Norland, Daniel. (2003). *Numerical Techniques for Acoustic Modelling for Design of Brass Wind Instruments*. Diss. 862. Upsala university, Faculty of Science and Technology. Available at: http://uu.diva-portal.org/smash/get/diva2:163064/FULLTEXT01.pdf. Accessed: 14.03.2019.

Norman, Andrew. (2003). *Sacred Geometry*. Available at: http://andrewnormanmusic.com/archives/101. Accessed: 05.04.2019.

Nowness. (2011). 'Raphael Viñoly at the Opera', 29 July.

Architect Viñoly turned set designer for Shostakovich's *The Nose*, and Strauss's *Die Liebe der Danae* in association with Mimi Lien, and The Bard School on both occasions. He sees set design as different from architecture, as relaxation (upon reconsideration this point seems to be simply my conjecture – I may be right, though – I may have read it somewhere else – or just guessed) and imaginative, not grounded like architecture, yet for the opera needing musical understanding.

Oliveira, Joana. (2017). 'William Herschel, the Father of Uranus'. *Open Mind*, 15 November. Available at: https://www.bbvaopenmind.com/en/william-herschel-the-father-of-uranus. Accessed: 13.10.2018.

A short synopsis of Herschel's life, clearly delineating the musical link of composer, player and instrument builder with the astronomical ability.

Outram, John. (n.d.). '"Pumping Station", for the Isle of Dogs, London'. Available at: http://johnoutram.com/iod.html. Accessed: 03.11.2018.

I remember reading this before. I understand it more now having studies aesthetics. There are misspellings and some quite fanciful writing about the narrative and iconography of the architecture, but the most baffling thing is that he claims to have been the architect working for J.O. (John O'Connell?), giving details about the civil engineering. Maybe Piers Gough was the overarching architect? It certainly was adduced to PG. This last supposition appears to be borne out by this website: https://historicengland.org.uk/listing/the-list/list-entry/1447069. In light of this and the Historic England document (see above) I can no longer attribute this to Piers Gough. I think what happened was that he delivered a TV programme extolling the virtues of this pumping station's architecture. I remember it now and the BBC archives show that there was such a programme: BBC Genome, BBC 2, 1 November 1988, Building Sights

Oron, Aryeh. (2007). 'Maurice Duruflé (Composer, Arranger)'. *Bach Cantatas Website*. Available at: http://www.bach-cantatas.com/Lib/Durufle-Maurice.htm. Accessed: 29.11.2018.

Padrós, Timoteo. (2008). 'Cantica Symphonia interview'. Glossamusic.com, 01 March. Available at: http://www.glossamusic.com/glossa/context.aspx?Id=32. Accessed: 12.03.2019.

As specialists in Guillaume du Fay, the leader of the group, and tenor, Giuseppe Maletto, and organist Guido Magnano, gave insights into the importance of Du Fay, the significance of *Nuper Rosarum Flores* as composed for the 'dedication of the Duomo of Florence' (from the text accompanying the video: Santa Maria del Fiore, the Florence cathedral with the dome by Filippo Brunelleschi) and the numbers involved relating the proportions of the dome to the isorhythmic mensural structure as 6:4:2:3, the *talea* within as further modified by tempo changes of 2:1, 1:2, 2:3 an so on. The overall length being determined by the mensural proportions reminds of Steven Daverson. Magnano considers these proportions like Pythagorean ones determining chords, 1:2, 2:3 and so on. Sometimes these variations occurring within the overall structure may not necessarily be easily discernible. They discuss use of instruments and the sort of HIP concerns. They rate du Fay as alongside, for instance, Bach.

Paris Agreement. (2016). Available at: https://ec.europa.eu. Accessed: 30.11.2018.

Parker, S. (2015). *Urban theory and the urban experience: Encountering the city*. Routledge.

As recommended by Michael Uebel via Researchgate for planning theory.

Parr, Freya. (2018). 'Winner of British Composer Awards', 05 December. Available at: http://www.classical-music.com/news/winners-british-composer-awards-2018-announced. Accessed: 06.12.2018.

Peabody. (2018). *BedZED, The first large-scale eco-community in the UK*. Available at: https://www.peabody.org.uk. Accessed: 27.10.2018.

Despite some know criticisms this is by and large a successful affordable home sustainable project.

Peacock, Kenneth. ‘Synesthetic Perception: Alexander Scriabin’s Color Hearing’ *Music Perception: An interdisciplinary journal,* Vol. 2, No. 4, Summer, 1985, pp. 483-505.

Peermusic classical (n.d.). *Mathias Spahlinger (b. 1944, Deutschland), Mathias Spahlinger has been awarded the “Grand Art Prize” of the Berlin Academy of Arts*. Available at: https://www.peermusic-classical.de/en/composers/mathias_spahlinger. Accessed: 12.11.2018.

Post-Modern Architecture – ‘More is More’. (10 May 2018). Available at: https://www.youtube.com/watch?time_continue=107&v=1LvRoyXxwC4. Accessed: 03.11.2018.

Piers Gough, Terry Farrell and John Outram are here held as leading lights of post-modernism. Elain Harwood of Historic England stated that Post-Modernism was about, history, relatedness to surroundings ‘and above all [had] a great sense of fun.’, ‘Irreverence’ came from America, ‘classicism’ from Europe and British architects ‘wove those two elements together’. Incidentally ‘More is More’ came from Robert Venturi in the USA.

Preceden. (2019). ‘Musical Styles’. *Preceden*. Available at: https://www.preceden.com/timelines/138296-musical-styles. Accessed: 27.03.2019.

Quintal, Becky. (2016). ‘121 Definitions of Architecture’. *ArchDaily*, 17 October. Available at: https://www.archdaily.com/773971/architecture-is-121-definitions-of-architecture. Accessed: 25.10.2018.

As an adjunct of the Architectural Review, a respected architectural journal, this is a sound source of quotations to use in a banner headline.

Ranjazmayazary, Mohammedreza, Abdollahzadeh, Taraf and Mahdavinejad, Mohammadjavad. (2016). ‘Comparative Study on Architectural Contemporary Schools Based on Interaction of Form, Function and Structure’, *Journal of Architectural Engineering Technology,* 13 November.

Recommended in discussions on Researchgate about structuralism and architecture by Gamul Abdul Hamid on 10.10.2019.

Ravenscroft, Tom. (2018). ‘Zaha Hadid Architects to design concert hall for Ural Philharmonic Orchestra’. *Dezeen*, 02 October.

Designed using sine sound waves, where one may have some criticism for Patrik Schumacher’s capitalistic view of modern architecture and perhaps the over reliance upon computer technology, mathematics and parametrics (which I don’t necessarily), surely the obsessive attention to detail that ZHA are known for will use the computer technology to get the reverberation levels correctly. I will use this during my discussion of concert halls which are notoriously, unbelievably and ironically, absent in this area. The design itself looks lovely.

Rawson, Robert. (2018). Inaugural professorial lecture, Old Sessions House, Canterbury Christchurch University, 15 February.

Redgate, Roger, Exarchos, Dimitris and Zaldua, Alistair (Convenors). (2015). 'Compositional Aesthetics and the Political', Goldsmiths Contemporary Music Research Unit, 20th-22th February.

Redhead, Lauren. (2015). 'The beautiful and the political'. *Contemporary Music Review*, 28 October, Vol. 34, Iss. 2-3: Music and Politics, pp. 247-255.

Reich, Steve. (1972). *clapping music for two performers*. Copyright 1980 by Universal Edition (London) Ltd., London.

Rem Koolhaas. (n.d.). *OMA Office Work Search*. Available at: http://oma.eu/partners/rem-koolhaas. Accessed: 30.11.2018.

Renn, Aaron, M. (2018). 'Architect Patrick Schumacher: I've been depicted as a fascist'. *The Guardian*, 17 January.

PS trumps urbanism and a sort of trickle down economy together with a centralisation of city mover and shakers. His manifesto at the World Architecture Festival advocated stopping all aid to the poor and affordable housing, yet he says he is championing everyone – this is definitely open marketism, privatisation and even elitism, a difficult pill to swallow. I don't think that I will find much musical inspiration here from whatever method/s I choose. To be fair he has some valid points about over bureaucratic governmental control and planning laws but to give a free hand to developers would fly in the face of all the rowing back that has occurred to protect countryside and green spaces.

Richardson, Lance. (2015). 'Turning Bridges Into Music'. *The New Yorker*, 27 July.

richelle db. (2017). 17 November. 'greg lynn: Korean Presbyterian church, new york'. *designboom*. Available at: https://www.designboom.com. Accessed: 01.12.2018.

Riley, Bridget. (2018). Available at: http://www.bittleston.com/artists/bridget_riley. Accessed: 31.10.2018.

This is useful from the point of view of Riley's development and artistic opinions which can reflect in music as per Glennie and Mermikides—see above—but also because she talks very interestingly about the picture plane, observer and then reversing this, which relates to my TFT theory.

Riley, Bridget. (2017). Available at: http://www.op-art.co.uk/bridget-riley. Accessed: 31.10.2018.

Riley, Bridget. (2018). Available at: https://www.artsy.net/artwork/bridget-riley-blue-and-pink-krefeld-print. Accessed: 31.10.2018.

Rink et al, (2019). 'Publications by Project'. *CMPCP*. Available at: http://www.cmpcp.ac.uk/research/outputs/publications-by-project. Accessed: 08.04.2019.

Roberts, Gareth, E. (2015). 'Composing with Numbers: Sir Peter Maxwell-Davies and Magic Squares'. *Math, Music and Identity, Monserrat Seminar Spring 2015*, 23 March. Available at: http://mathcs.holycross.edu/~groberts/Courses/Mont2/Handouts/Lectures/Davies-web.pdf. Accessed: 13.03.2019.

Robertson, Anne, Walters. (2010). 'The Man with the Pale Face, the Shroud, and Du Fay's *Missa Se la face y pale*. *The Journal of Musicology*, Fall, Vol. 27, No. 4 pp. 377-434.

This work is concerned with the work of Guillaume du Fay and others depicting Christ as with a pale face, specifically du Fay's mass *Missa Se la face ay pale* (early 1450s), the use of secular songs and the context within wedding songs. A main import for this research is the reference to his composition of *Nuper Rosarum Flores* in 1436 for the dedication of the Cathedral of Florence featuring Brunelleschi's dome. Interestingly, a painting cited, Fra Angelica's *Crucifixion* of c.1425-40 is claimed to have been helped by Brunelleschi himself. His style is set within the Renaissance polyphony with use of isorhythm. This mass uses Cantus in the soprano or treble range (a new feature for the times), Contratenor in the Alto range, Tenor 1 and Bassus (the new directors of harmony), as taken from Alejandro Enrique Planchart's source, where he seems to be an if not the leading expert on Guillaume du Fay. Incidentally, use of written text somehow reminds of Steven Daverson's PhD over 400 years later. The analogies of pale faces are of lovers of beautiful women, Saint Mary the virgin and of Christ's suffering on the cross for mankind. The iconography around influenced du Fay and others and so it seems that with Brunelleschi being somehow involved even in the art depicting the crucifixion and du Fay was steeped in the religious feeling of the time. The use of secular music it is argued is to make religious sentiments more accessible to ordinary people not versed in Latin, so the piece *Nuper Rosarum Flores* is an example of religious spirituality expressed, in this case—and often cited as the first or one of the first pieces of music written *for* architecture—is a wonderful example indicating the link between architecture and music.

Rother Valley Timber Ltd. (2018). *Timber Mouldings*. Available at: http://rothervalleytimber.co.uk/par-mouldings. Accessed: 23.11.2018.

Rubik, Beverly. Chapter 20 of "Energetics and Spirituality" by Lyn Freeman, in 'Measurement of the Human Biofield and Other Energetic Instruments'. © 2009-2018. Available at: http://www.faim.org/measurement-of-the-human-biofield-and-other-energetic-instruments. Accessed: 21.09.2018.

Beverly seems to be one of the leading exponents of what could be called new age/ alternative approaches to medicine and related health topics which she seems to base upon sound science. The biofield would come within my TFT ambit.

Rugg, Whitney. (2002). '*Kitsch*'. *University of Chicago, Theories of Media, Keywords Glossary*, Winter. Available at: http://csmt.uchicago.edu/glossary2004/kitsch. Accessed: 02.11.2018.

Ruskin, John. (1907). *Seven Lamps of Architecture*. London: George Allen & Sons.

Given as a present some years ago I now find that a hardback edition is worth a lot, but I would not sell this since it was a present. It is weird that now I value this even more, which is wrong since it should only be for its inherent worth – although in the Preface to the 1880 edition Ruskin was well aware even then of monetary worth of early editions for collectors and of the plate illustrations. This apart, architecturally, this is a work of paramount importance, amongst other things, celebrating the results of the hand of the craftsman. This latter point could be said in a way to prefigure the Critical Theory of the Franfurt School of Adorno, Horkheimer and others.

Sahar, Chris. (2019). 'Christopher G. Sahar'. *Editions Musica Ferrum*, 'one week ago' as at 08 April. Available at : http://www.musica-ferrum.com/composers/christopher_g_sahar.php. Accessed: 08.04.2019.

Christopher Sahar, a composer in his own right, has produced a critique of Richard Barrett's *Construction* as the first comment of the online version and in reply to John Appleseed, a frequent commenter upon YouTube music (yet his website has no content: he remains incognito) (see above entry). Sahar's contention is that despite Richard Barrett's noble intentions, his music is a pastiche of what has been extensively examined since the 1960s in the music of Stockhausen and Lachenmann and he defends the music of former composers such as 'Bartok, Stravinsky, Schoenberg and even Carter'. Sahar considers Barrett's vocalisations are as similar to as carried out before by Berio, and even '50's doo-wop' Another main platform of his argument is that he considers that really Barrett's music should be expressed electronically, since he sees this as incipiently Barrett's real intention and where greater control of sound could result in a better outcome, and not by using live instruments [even though in the talk-over Barrett explains his integral conception of the sound system as part of his composing mechanism]. Finally, Sahar signs of with: 'Face it, as one who is a composer too, one must accept that you will never please everyone and vice versa.'.

Saletnik, Jeffrey and Koehler, Karen. (2018). 'Introduction: Objects of Architectural Translation'. *Art in Translation*, Vol. 10, Iss. 1, pp. 4-10.

This is particularly useful insofar as the topic of 'translation' from and within architecture is concerned. It seems that this is a relatively recent subject as a solid academic area of study. Saletnik is given as the author but Koehler is stated as well, so credit should surely go to both, but the main name seems to be Saletnik, so I will use that.. A variety of papers are resuméed dealing with how ideas are transmitted from mind to drawing paper and then what this represents. The whole problem that is inimical to TFT, that is, whatever is happening in the mediating stages, or processes, between the object and observer, or creator, or between object and object, or whatever, is, as originally stated by Walter Benjamin, as 'difference' (later taken up by Deleuze Derrida and others), where a 'hermeneutic' *poiesis* is transmitted by, as it were, metaphor. According to Saletnik, Mieke Bal and Joanne Morra in 'Acts of Translation' in *Journal of Visual Culture* they likened Walter Benjamin's textual approach to visuality, hence to architecture. Issues covered are to do with the role of drawings, which, moving from the nineteenth century stance, which, as with music, was conventional, where they simply represented templates and instructions of how to build, whereas now even the most basic interpretation includes investing the drawings with some agency or power beyond the mere representational. Robin Evans ascribes a 'generative' power to drawings, even 'agency' and that the power could be 'hegemonic', that drawings could be seen as 'heuristic device[s]' where the process of converting from drawings to erected buildings is 'transmutation'. In the practical world of construction it could be easy to see this sort of concept as stretching imagination too far, yet with the background of Walter Benjamin's questioning of what is really happening between objects and their representation, it then becomes easier to understand. What is the mediating process? Can interventions happen in the space between the drawing and the physical reality of erecting the building? In a footnote, Saletnik cites W. J. T. Mitchell and Mark B. N. Hansen in their introduction as editors of *Critical Terms for Media Studies* (Chicago: University Press, 2010, vii-xxii) as stating that 'mediating object' (not just drawings, but text, models, built forms and art works) are 'value-laden forms worthy of study in their own right.'.

Saletnik goes on to say that drawings and other mediating objects (for simplification just called drawings here) 'shape—and are shaped by—cultural and ideological obligations.'. He elaborates that the application of hermeneutics to interpreting drawings really took off in 1980s along with all the other concerns of postmodernism, of language, history, geography,

even globalisation and politics. In the 1990s two people expressed worries about CAD's (Computer Aided Design's) interfering role, Joseph Rykwert and Pérez-Gómez. Joseph Rykwert considered, that in the classic architectural model of the concept stage to the building stage, which RIBA (the Royal Institution of British Architects) calls The Plan of Work and Rykwert calls the 'translatic cycle', decisions are made, or 'judgement' is used, which inevitably adulterates the 'architectural poetic.'. This, for me is interesting, because it is akin to something that happens in musical processes which I believe is not widely acknowledged and that is during so-called aleatoric or deterministic compositions, events are not so free as one thinks, that often human intervention transforms the music by key decisions made during the process. This could be in dice throwing, use of random numbers (where again the question of randomness could be debated), or say the compositions of Nono, Maderno and Sir Peter Maxwell Davies, where serial number rotating tables or magic squares are used. This is both an aside as well as being relevant here, but letting the 'aside' factor win out here, this will not be pursued further here, merely noted as a possible subject for later further research.

Pérez-Gómez's qualms about CAD were nuanced slightly differently, in that he was worried about the 'meaning and ethics' in the end product. Having taught CAD to engineers, construction managers and budding architects, I have wondered about these sorts of issues. To allow myself to digress slightly here, I will express these thoughts which are largely in line with those of Rykwert and Pérez-Gómez. The relevance here is that, for me, during these researches a growing awareness of sociological and political issues surrounding architecture needs to be taken into account to fully express architecture in music. Also, when making decisions about the means of translation in order to arrive at a score or some other way of making music, where computers are increasingly coming to the fore, with electronic music and algorithms to assist with the translation and generation of music, then this discussion of the now predominant means of producing drawings, which I believe to be the case, and what they represent in terms of the outcome expressed above, this could be a vital discussion needed. However, upon reflection, this issue could become extensive, so it will be referred to the 'further research' items pool towards the end. At least the point has been registered.

It is worth completing this comprehensive survey of Saletnik and Koehler, to serve as a thorough up to date review of translation in architecture as impacting upon this project. Useful words in this context that emerge in connection with Ian Boyd White are interlingual, intersemiotic, intertextual and intercultural, where the prefix inter~ indicates the growing interconnectedness of planet earth, influences of languages, customs and signs across national borders. Saletnik says in connection with Ian Boyd White that 'translation is a useful framework' to 'understand appropriation in architecture insofar as it enables a view of an appropriate object or motif'. Architecture is rife with symbols, signifiers, stylistic emblems, so it is comforting to think that this is endorsed as suitable for translation, perhaps as Cevanne Horrocks-Hopayian has done in connection with Khadambi House. Boyd White illustrates with Gottfried Semper's *Stil in den technischen und lektonischen Künsten* (1860-2) where he talks about a process of transformation between the original and subsequent material. So, translation can change the message and architecture can change where it 'appropriates'. Some examples will make this clearer. Esra Akcan and Finbarr Barry Flood discuss intercultural translation with disjunctive methodologies.

Esra Akcan uses 'Benjamin, Jacques Derrida, and Gayan Spivak as conceptual metaphors to understand the movement of architectural ideas and technologies between cultural contexts in her study of the flow of architectural ideas between Germany and Turkey in the first half of the twentieth century.'. Akcan's analysis is more concerned with the conceptual than as with Flood, who is more concerned with the 'how', the 'mechanism' and 'sociomateriality'. He uses 'sociological, anthropological, postcolonial, and semiotic approaches to translation' and the 'circulation of objects'. He examines this effect in South Asia 'through the mobility of people and things', where 'meaning and values' are translated, and, interestingly, he uses the word 'transfigured'—this must be a change brought about during translation of the most extreme effect, and surely this means for the better. Is this a Heideggerian heightening of the phenomenal? This sets the bar high for translating architecture into music!

Kathryn Blair Moore talks about architectural documents' 'complex mediating role'. This could seem to mean the immense taxonomic structures of documentation that can almost

be suffocating in their immensity, such as of Jorge Louis Borges' infinite library (see above: Borges, 1998), the PASs and British Standards of which one is BS 1192:2007 + A2:2016. But, luckily, she is talking about the hidden information in architectural drawings, perhaps somewhat similarly to the manuscript research of musicology, yet invested with almost a mystical meaning, such as of the drawings with added significance showing the cruciform shape of the *Nablus* church in the *de Locis Sanctis* (679-704) with vestiges of the Holy Land. Here, apart from actual relics, is intended a signification of the Holy Lands for pilgrims unable to make the actual visit, where the symbolism, meaning and spirituality is all bound up in the architecture, and the actual drawings for that architecture to 'approximate and collectivise—the experience of pilgrimage.'. If I produce music in connection with churches and cathedrals, will I be able to latch onto this sort of signification? This will be a difficult and most likely requires intuition, empathy and the 'correct' sort of attitude, sympathetic and receptive; possibly, also, some research into appropriate church music methodology and some history of the place, but as noted earlier, this may need a light touch so as to remain responsive and spontaneously creative and modern, as Adorno would advise.

Still in the mode of cogent signifiers in architecture, Carolina Mangone came to the conclusion that Michelangelo's addition of ornamentation to an existing work of Vignola's, the *Regola delli cinque ordine d'architettura* (1572) , helped establish national identities and vernacularisation.

Sherry Simon found linguistic German and Czech rivalries expressed in the *Neues Deutches Theater* (now Státni opera Praha) and the *Národni divadlo* (Czech National Theatre), and, Dwight Carey found several languages in evidence in the architecture of Mauritius, echoing the ambiguity of slave workers and colonial masters, so buildings can tell stories if one knows the language or languages for translation, as with ancient hieroglyphs.

In the same vein of drawing containing hidden information, Min Kyung Lee considers, perhaps akin to Blair Moore, that drawings can be 'approximate', not necessarily literalistic, that they can also show other information, such as the French drawings of the nineteenth century, where structural layout shows organisation that is over and above the wishes of the ordinary people, perhaps embodying an element of subjugation. This is an example of another trend emerging in the interpretation of architecture, that of power, perhaps of the sort talked about by Foucault (1969, 1972).

Finally, Karen Koehler, makes a case for biography sometimes showing in architecture, as of the multi-artist, Louise Bourgeois's, semi-fictional, architectural photographs, alongside text, evoking childhood memories, in her *Album* (1994).

As Saletnik stated, architecture, when seen in these modes of translation, can have a 'heavy burden', that is, much can read into it now. Drawings may no longer be just flat sheets of paper with lines, arc, circles and instruction notes, and buildings may not just be edifices displaying the functions of shelter, comfort and other uses, They may have semiotic stories to tell, which can then be incorporated into compositions drawn from those buildings.

Sandborn, Mark. (2013). *The Language of Colour and Sound, virtuoso 3.0, electronic music education programme*, copyright 2011by Virtuoso Music International, Videography by Jack Ramshaw, Colour Wheel Theory, The Circle of Fifths (5ths), and Sight Reading Music. Available at: https://www.youtube.com/watch?v=Viue81moXis. Accessed: 05.12.2018.

Sandborn, Michael and Vatsyayana, Nataliya. (2014). 'A Rosetta Stone: The Universal Harmonic Language Model'. *Language, Arts & Disciplines*, 16 August, 256p.

Use for working out chromatic changes to music, as shown in Mark Sandborn's video and re-examine the first part about space. This looks like being another endorsement of TFT, something to incorporate within TFT (see also Milton Mermikides PhD thesis).

Sanderson, Blair. (2018). ‘Julliard String Quartet, Elliott Carter, The Five String Quartets’. *Allmusic* (Review). Available at: https://www.allmusic.com/album/elliott-carter-the-five-string-quartets. Accessed: 23.11.2018.

Santonocito, Giuseppe. (2009). ‘Adesso l’architettura. Jacques Derrida’. *Domus*, 04 June.

A useful discovery, in *Domus*, a respected architectural periodical, on, apparently, Derrida’s sole writings on architecture, although, apparently, there is one writing omitted as untranslated, *Pointe de Folie–Maintenant l’architecture*. This latter is, apparently, Derrida’s response to being asked by Bernard Tschumi to collaborate with Peter Eisenman designing a garden for Parc de La Villete, Paris (never actually realised), misinterpreted by the architects, notably Philip Johnson giving rise to the expression Deconstructiviste Architecture for a MoMA New York exhibition. In *Adesso l’architettura*, quoting: ‘Derrida saw architecture as the last bastion of metaphysics, “The art that is most resistant to what counts as destabilisation or deconstruction, because it is the soundest art” (p.186), and he embarked on a systematic dismantling of its institutional axiomatics. After all, Derrida’s deconstruction had always focused on institutions and, more specifically, their rethinking and de-institution. No differently from all the other western institutions, to Derrida’s eyes architecture could also be accused of having congealed around a huge constructum, an anti-structure of fundamental values - habitability, functionality, monumentality and aesthetics – that over-determine its practices like a hierarchical cannon. He [Derrida] attempted to return the presumed transcendencies (metaphysics) to a plane of immanence where nothing is an absolute sign and everything – including architectural lemmas – must be reconsidered in the light of ideas, traces, deviation, deferred worldliness, deferral and transhumance. Deconstructed architecture, the architecture of the event, of non-saturation and of incompleteness, is a thinking process that poses the question of space as an open problem, without trying to control and define it once and for all (the greatest aspiration of modern architecture), leaving it free to embrace all the possibilities for the future.’. Architecture needs ‘maintenant’ which is maintaining to be alive, yet to cede all claims on space, to give up being architecture!

Schramm, Robert, D. (2019). ‘Brass Band Instrumentation’. *The Brass Crest*. Available at: https://brasscrest.com/instru001.html. Accessed: 10.04.2019.

Schubert, Emery. (2009). ‘The fundamental function of music’. *Musicae Scientiae*. © 2009 by ESCOM European Society for the Cognitive Sciences of Music, Special Issue 2009-2010, pp. 63-81.

Schumacher, Patrik. Available at: http://patrikschumacher.com. Accessed: 31.10.2018.

PS is quite an academic and in this website one finds a range of polemical lectures, interviews and writings. It seems to be generally in the German didactic tradition, including aesthetics, poiesis and other, as it were, modern ‘classical’ concepts and interestingly his views on parametricism which is his and others’ current view of what architecture consists.

Service, Tom. (2016). ‘Sound Frontiers: Music and Technology’. BBC Radio 3 *Music Matters*, 03 October.

Shannon, Claude, E. (1948). ‘A Mathematical Theory of Communication’, Reprinted with corrections from *The Bell System Technical Journal*, July, October, Vol. 27, pp. 379-423, 623-656.

Sheldon, Michael. (2004). ‘My affair? I don’t think Jackie knew’. *The Telegraph*, 15 July

Sillitoe, Stuart. (2017). Wolfgang Rihm (b. 1952), *Geste zu vedova* [10:03], Streichquartett in g [9:14], Streichquartett (1968) [15:37], *Epilog* [11:57], Minguet Quartett, Jens Peter Maintz (cello), rec. 2015/16, Deutschlandfunk Kammermusiksaal, Köln, WERGO WER73462 [47:04].

Sinha, Amresh. ‘Adorno on Mimesis in *Aesthetic Theory*, in Briel, Holger and Andreas Kramer, eds,. *In Practice: Adorno, Critical Theory and Cultural Studies*. Bern: Lang, 2000, pp. 145-159.

Smith, Ronald. (2002). *The Role of architecture and sociology in organisational development*, Sociology Faculty Publications, June, University of Nevada Las Vegas.

This short paper illustrates how sociology can inform architectural decisions about layout, where management and organisational theories that are post-bureaucratic, democratic, open, of flat hierarchy and encouraging of creativity tend to use open plan offices, with break-out areas for informal sharing of ideas, centralisation of printing in one room and involvement of employees in the design layout.

Smolin, Lee. *Loop Quantum Gravity: Lee Smolin [2.24.03]*. Available at: https://www.edge.org/3rd_culture/smolin03/smolin03_index.html. Accessed on: 06.09.2018.

A discussion of the differences between string theory and loop quantum theory.

SoftSchools. (2019). ‘History of Fashion’. *SoftSchools*. Available at: http://www.softschools.com/timelines/history_of_fashion_timeline/267. Accessed: 27.03.2019.

Spahlinger, Mathias. (2015). *adieu m’amour (homage à Guillaume Dufay)*. Ensemble Dal Niente, Wulliman, Austin, violin and Wild, Chris, cello, 14 March, University of Chicago. Available at: https://www.youtube.com/watch?v=Iu52KumKQfQ. Accessed: 08.04.2019.

Proving that ancient and modern can go together, albeit in a predominantly modernistic interpretation, and definite references to Guillaume du Fay’s music is made all the more exquisite within this setting. Lovely, slow, some scratching, not much gentle harmonics, an example of enveloping silences embellishing the notes played.

Spahlinger, Mathias. ‘political implications of the materials of new music’. *Contemporary Music Review*. Volume 34, 2015, Issue 2-3: Music and Politics.

Incisive thoughts based upon a Marxist democratic view of modern music.

Spears, Tim. (2016). ‘patrick schumacher interview on zaha hadid’s ultrastellar collection’. *Designboom*, 04 October.

Steckel, Sita. (2018). ‘Verging on the polemical: exploring the boundaries of medieval religious polemic across genres and research cultures’. Medieval worlds, No. 7, Pohl, Walter and Gingrich, Andre (eds).

Stewart, Jessica. (2017). ‘Florida Is Getting a 450-Foot Hard Rock Hotel Shaped Like a Giant Guitar’ 23 November. Available at: https://mymodernmet.com/seminole-hard-rock-guitar-building. Accessed: 02.11.2018.

Stewart, Jessica. (2018). ‘Zaha Hadid’s Legacy and her Top 10 Masterpieces’, 20 February. Available at: https://mymodernmet.com/zaha-hadid-architecture. Accessed: 01.11.2018.

St. Hill, Michael. (2013). ‘The Architecture of Music and the Myth of Progress’, Michael L. St. Hill Principal Michael St. Hill Architects and Planners Ltd., 13 June, *Architectural Review*.

As a riposte to Charles Jencks’ article in the AR it seems to me that this is an article by the sort of architect who gives architects a bad name amongst builders and possible others, arrogant, ill-informed, pompous, self-puffed up, with a loud voice, jolly pleased with what he has to say and speaks so loudly that others have to hear him, in the hope that the hearers will say what a jolly fine fellow you are, so wise and correct and we’ll listen to every word you say and act on it (with constant bowing motions).

Stone, Sophie. (2018). ‘Cevanne Horrocks-Hopayian, visiting independent composer’. Centre for Practice-based Research in the Arts, Canterbury Christ Church University, 02 May.

Storer, Lisa and Yang (Malya), Chia-Hui. (n.d.). *Arup’s Environmental Strategies, Engineering + Sustainability + Architecture*, based on a lecture by Michael Sweeney, UTSoA Seminar in Sustainable Architecture.

It appears that the report was by students who in trying to provide a balanced account spent most of the time providing positive data about the case studies of the San Francisco Federal Building, the California Academy of Sciences and Dongtan Eco-city and at the end provided a critique of the methods of calculation which seemed weak – generally informative endorsing Ove Arup as a leader in sustainability.

Studio Libeskind. (2018). *Tangent Façade Seoul, South Korea*. Available at: https://libeskind.com/work/tangent-facade-design-for-the-hyundai-development-company. Accessed: 03.11.2018.

The picture of the Hyundai façade was taken from here.

Stylepark AG. (2018). ‘The Composer’ (Fabian Peters interview with Reinier de Graaf, partner at OMA, Office for Metropolitan Architecture, Rotterdam, at ‘Architecture Matters Conference, Munich’) *Architectural Digest*, 07 November.

Reinier De Graaf admitted to being influenced by Tom Wolfe’s *From Bauhaus to our House*, Mosche Safdie’s Habitat 67 and the structures of Herman Hertzberger from the experimental period of the 1960s and 1970s in his latest Norra Torren in Stockholm and earlier Timmerhuis in Rotterdam where he said they ‘tried to achieve maximum variation with standardised elements. Not variation for variation for variation’s sake, but we tried to create the best possible architectural quality for the inhabitants with an embraceable sort of industrial standardization.’. Peters cited Wilfried Kuehn of Kuehn Malvezzi Architects as saying that ‘low-cost residential construction’ stopped in the 1950s in Germany with the significant IBA project in Berlin in 1954. De Graaf disagreed saying that there were two Germanies, East and West and in the East and in the East they had the *Plattenbau* developments where there were ‘close links between architects and the concrete industry’

creating ‘some very interesting solutions, less in terms of floorplan concepts and more in terms of the possibilities and requirements of standardized buildings.’ The point being here that there were attempts at social housing in Germany and De Graaf at OMA are still carrying on in that vein.

Suppes, Patrick. (1991). ‘Rules of Proportion in Architecture’. *Midwest Studies in Philosophy,* XVI.

Suppes outlines some of the rules of Vitruvius and Palladio, including simple formulae for the arithmetic, geometric and harmonic means, starting by criticising their over rigid approach, then criticizes Hume, Burke, and Kant for their non-empirical, theoretical approach, then criticises researchers on visual in-depth research such as has been carried out regarding music and ends up suggesting that whilst one does not want to impose regulations on beauty he considers that there could be more substantive rules in the same way that there are for use of technology and structures in buildings.

Swain, Corinne. (n.d.). *Foresight Future of Cities*, Understanding current city foresight practice, Supporting Paper for ‘Foresight for cities: a resource’, Government Office for Science.

Mainly based upon an economic outlook, social and cultural issues are included. An examination of key statistics to do with funding, local authority and government strategies for organising and expanding cities, including ‘corridors’, with some consideration of infrastructure needs, housing and increasing population and employment issues.

Swanson, Claude. (2011). *Life Force, the Scientific Basis: Volume 2 of the Synchronised Universe*. 2nd edition. Tucson, Arizona: Poseidia Press.

Mentioned in Thornton Streeter’s video entitled *Mapping the Anatomy and Physiology of the Human Biofield, Quantum Consciousness 2015, Thornton Streeter DSc for Biofield Sciences*. Available at: https://biofieldviewer.com. Accessed: 21.09.2018.

Tagg, Philip. (1997). ‘Music and Cultural Theory’, Shepherd, John and Wicke, Peter. Cambridge: Polity Press, ix, + 230 pp. Essay review for Popular Music (Unabridged version).

Targowski, Alex. (2012). ‘Extended Violin Techniques’. 02 May. https://extendedtechniques.blogspot.com. Accessed: 05.04.2019.

Tate. *Malevich*, 16 July–26 October 2014, Tate Modern, Bankside, London.

Tate. *Shape of Light, 100 Years of Photography and Abstract Art*, 2 May–14 October 2018, Tate Modern, Bankside, London.

Taylor, Laurie. (2018). *Thinking Allowed, Architecture and Health*. BBC Radio 4, 14 November.

In essence covering sociological implications of architecture of high-rise (Ian Sinclair Pepys Estate, Deptford or Le Corbusier (Radiant City) Golden Lane Estate near the Barbican), care homes (Daryl Martin) and urban planning (Christine Murray of Women in Architecture discussing community needs)

Tewari, Saurabh. (2015). ‘Laurie Baker: A Model for Sustainable Architectural Design’. Conference: Cumulus Mumbai 2015: In a planet of our own – a vision of sustainability with focus on water, Vol. 1, December.

The Art Story Foundation. (2019). *Kazimir Malevich*. Available at: https://www.theartstory.org/artist-malevich-kasimir.htm. Accessed: 07.2.2019.

The Editors of Encyclopaedia Britannica. (2018). ‘Guillaume du Fay’. *Encyclopaedia Britannica*, 23 November. Available at: https://www.britannica.com/biography/Guillaume-Dufay. Accessed: 12.03.2019.

The Happy Pontist. (2011). ‘Cumbria Bridges: 1. Fisherman’s Bridge, Cumbria’. Available at: http://happypontist.blogspot.com/2011/10/fishermans-bridge-cumbria.html. Accessed: 21.1..2018.

The Happy Pontist. (2008). ‘C3 #297: Beyond the Bridge”’, 25 July. Available at: http://happypontist.blogspot.com/2008/07/c3-279-beyond-bridge.html. Accessed: 14.11.2018.

Like the *fisherman’s bridge* except not musical as such, but like it in being eccentric, built for private use, with ‘non-crowd-funding’ money, non-compliant with health and safety or disability considerations, designed to mimic reeds—looks charming.

Topliss, Simon and Hurst, Mike. (2010). *Construction & The Built Environment, Level 3, BTEC National*. Essex: Pearson Education Limited.

This seems to be the latest edition.

The Participation, Power and Social Change Team at the Institute of Development Studies, University of Sussex. (n.d.). ‘Bourdieu and ‘Habitus’’. Available at: https://www.powercube.net/other-forms-of-power/bourdieu-and-habitus. Accessed: 25.10.2018.

Contrary to Foucault’s ‘ubiquitous’ non escapable power, Bourdieu’s view is that ‘habitus’ is a mix of free will and forces from society’s cultural norms, which can shift and be changed. A related concept is ‘capital’ similar to Marxian notions of capital yet more subtle and culturally related, less easy to spot when shifting from materialism to a cultural notion. A third concept is ‘fields’ which very much relates to my TFT and can operate within it. The fourth and final concept is ‘Doxa’ similar to Marxian ‘false consciousness’ and as before more subtle in its reach, with a final concept similar to ‘Doxa’, ‘misrecognition’ which is a misreading/ misunderstanding of one’s place in society, hence a false reading of the power situation affecting one.

Tracery, Architecture. (2018). *Encylopædia Britannica* (Eds.)

Trachtenberg, Marvin. (2001). ‘Architecture and Music Reunited: A New Reading of Dufay's Nuper Rosarum Flares and the Cathedral of Florence’. The Free Library. *Renaissance Society of America*. Available at: https://www.thefreelibrary.com. Accessed: 13.12.2018.

Trueman, C. N. (2018). ‘Social Action Theory’. *The History Learning Site*, 11 October. Available at: https://www.historylearningsite.co.uk/sociology/theories-in-sociology/social-action-theory. Accessed: 29.10.2018.

Trueman succinctly distinguishes between macro, functional ([Emile] Durkheim, top down determinist, structural like Marxism, view of society as distinct from individuals) and micro (Max Weber, subjective, individual, human, although he believed in a combination of structure with classes, groups and parties and social action (with 'deviance' as a measure defined by Becker (1963) when perceived as such by society), with intended meaning (trying to be worked out as 'erklärendes verstehen'), affective, traditional custom based, or rational which Weber sees as the end goal of modern societies of bureaucratic organisations, as well as the interpretive approach of observing ('aktuelles verstehen', qualitative overt or covert Participant Observation) typically individual roles within families, in this respect similar to functionalism yet with perhaps a weakness of discounting wider influences of society such as power distribution). In Theory of Structuration (1979) Giddens argues that structure and social action are interdependent. On the other hand, Archer (1982, 1995) argued that individual actions cannot change society. Phenomenology and ethnomethodology are distinct from society. Berger and Kellner (1964) ague that individuals 'need to make sense of' the world around them and 'create order' 'to avoid anomie'.

Trueman, C. N. (2018). 'Unstructured Interviews'. *The History Learning Site*, 11 October. Available at: https://www.historylearningsite.co.uk/sociology/research-methods-in-sociology/unstructured-interviews. Accessed: 29.10.2018.

> This could be useful because I have as at this date two interviews projected and I am wondered whether to have unstructured or semi-structured interviews. The pros and cons are well argued, citing Minichiello (1990), Punch (1998), Patton (1990), Ann Oakley (1974), Joan Smith (1998), The British Social Attitudes Survey, J. Allen, Williams Jr., and USA Episcopalians. The cons are that data might be random and difficult to fit strict subsequent analysis, there may be inaccuracies of information due to disparity between interviewer and interviewee, exaggeration and interviewer bias in leading questions to the extent that questions are asked. Pros are that interviewees might open up and provide more in-depth information than by predetermined questions. In each case I think the semi-structured approach fits. One is a sound artist who has a PhD, has interesting views with an open political slant and has offered a recorded interview. He is in a combined world of music and art and for me will most likely be very interesting and provide lots of useful information to open questions that are in my mind. I think also a respectful and mutually respectful, methodology would be conducive to obtaining useful information. The semi-structured approach would therefore include some directed questions directly related to my research. Similarly, the second interviewee in mind is a well-respected architect head of his practice. A respectful an open approach should yield far reaching opinions on the nature of the relationship between architecture and music.

United Nations, Department of Public Information. (1997). United Nations Conference on Environment and Development (UNCED), Rio de Janeiro, 3-14 June 1992, The Earth Summit, 23 May. Available at: http://www.un.org/geninfo/bp/enviro.html. Accessed: 23.10.2018.

This was the vital stepping stone in the history of sustainability meetings and milestones, such as the Brundtland Report 1987, the Kyoto Agreement 2008-12, the Paris Agreement 2015 and various other meetings such as the G (group) set (variously 6,7,8 & 20) and IPCC 2018, where issues other than pure environmental issues were to be included, such as socio-economic issues. These were followed up at 10 yearly stages with the last in 2012.

Utwente. (2018). https://www.utwente.nl/en/bms/communication-theories. Accessed: 13.10.2018.

A very useful, comprehensive and succinct website covering all sorts of relevant topics to do with communication. I have emailed for a citation to use.

Vdocuments. (2015). *Grisey, Gérard*. Available at : https://vdocuments.site/gerard-grisey.html. Accessed: 19.11.2018.

Wainwright, Oliver. (2018). 'Will Alsop obituary'. *The Guardian*, 14 May.

Wainwright, Oliver. (2016). 'Dirty house music: how David Adjaye's brother turns his buildings into beats'. *The Guardian*, 14 July.

Walden, George. (2011). 'Nikolaus Pevsner: The Life by Susie Harries – review'. *The Guardian*, 07 August.

Pevsner as the author of the 46 volumed *The Buildings of England* and lover of churches is a consummate authority to refer to. Interestingly, according to Susie Harries, there was perhaps some 'banter' about 'Herr Doctor Professor' by Betjeman about Pevsner and amusement at *Kuntsforschung* (art research), although Pevsner was one of the pioneers of art research along with Gombrich and possibly the publisher Weidenfeld.

Wall, Amanda. (2013). 'Violin Bowing – A List of Terms'. *AmandaWallStrings*, 02 October. Available at: http://andrewnormanmusic.com/archives/101. Accessed: 05.04.2019.

Wang, Dean. (2015). Hat are all the violin techniques?', answer in *Quora, 12* September. Available at: https://www.quora.com/What-are-all-the-violin-techniques. Accessed: 05.04.2019.

Watts, Andrew. (2019). 'Pattern books re-emerge in digital form to disrupt construction'. *CIOB BIM+*, 31 March. Available at: http://www.bimplus.co.uk/analysis/pattern-books-re-emerge-digital-form-disrupt-const. Accessed: 02.03.2019.

Webb, Patrick. (2018). *A Craftsman's Philosophy*. Available at: http://realfinishes.blogspot.com/p/a-craftsmans-philosophy.html. Accessed: 23.11.2018.

He has an interesting philosophy combining Aristotle, Buddhism, Taoism, phenomenalism, instrumentalism, John Ruskin and links architecture to literature, which can be further extrapolated to music and displays strong empathy with music anyway. He must surely be a prime candidate for examining in connection with this thesis.

Webb, Patrick. (2013). *Moulding Theory*. 20 June. Available at: http://realfinishes.blogspot.com/2013/06/plaster-education-series-moulding-theory.html. Accessed: 23.11.2018.

This ties in with my domestic case study. He is an obvious craftsman rooted in classical orders yet with an enquiring and open mind.

Weber, Bernard. (2016). Zaha Hadid: A Tribute, 01 April. https://about.new7wonders.com/2016/04/01/zaha-hadid-a-tribute. Accessed: 01.11.2018.

Short, informative and reverential.

Wiles, Will. (2009). ‘Modular Man by Le Corbusier’. *Icon*, 23 June.

A short penetrating article critiquing Le Corbusier, the human form in architecture which in the end he advocates, parametricism and biomorphism. In the process he mentions Einstein’s ambiguous comment on the Modulator as a ‘tool that makes the good look easy and the bad difficult’, Charles Jencks as a Le Corbusier expert, Peter Eisenman and Cecil Balmond [a pioneering structural engineer calling for unity of architecture and structural mechanics] as inheritors of the Modulator.

Williams, Christopher. (2015). *A Treatise Remix*, after *Treatise* by Cornelius Cardew, with Christian Kesten (voice, object, translations), Andrea Neumann (inside piano), Robyn Schulkowsky (voice, percussion), Christopher Williams (voice, contrabass).

Interesting that in here was a short snippet of a voice recording of Cornelius Cardew who invited others to make their own music based upon the score which is his music. The idea of the score being his actual music allies with Peter Eisenman’s initial view of his drawings, perhaps the first two stages of his view where in the Ansari interview (2013) he has three, theoretical, grounded and affective-subjective (my interpretations) and Saletnik and Koehler’ discussion of the role of drawings (2018). Perhaps I need to cover more on the role of musical scores.

Williams, Christopher. (2018). *Notation for Improvisers*. [Illustrated lecture talk] Canterbury Christchurch University, Maxwell Davies Building, MDGo1, 25 January.

Williams, Christopher. (2011). *Tactile Paths: On and Through Notation for Improvisers*, PhD Dissertation, Academy of Creative and Performing Arts, University of Leiden, Holland.

Where under the above entry on *A Treatise Remix* I said more needed to be done on actual scores, well here is a lively source, where the thesis is that it can be organic with participation of performers actually in the score.

Williams, Jan. (1983). *Morton Feldman: Interview*, 22 April.

A simply fascinating interview in 2 parts. Morton Feldman mentions *Marginal Intersection* (1951) in ‘categories’ of ‘metal, glass and wooden sounds’ for percussion. He also discusses his grid music.

Wilson, John. (2016). ‘Front Row’. *BBC Sounds*, David and Peter Adjaye, on their new project ‘Dialogues’ as linked on Facebook, The Vinyl Factory, 21 July. ‘Can bricks and mortar inspire great music? Listen to the great BBC Radio 4 interview with David and Peter Adjaye on their new project ‘Dialogues’.

Where the brothers, David and Peter, have collaborated Peter admitted to getting’ very much an instantaneous reaction’ when walking around David’s buildings. He adduces this possibly due to an emotive story as with the Stephen Laurence Centre in Deptford, London or say a library connected with a community. Peter says he responds to the spaces in a geographical way, for instance with the Stephen Laurence Centre, starting with walking from outside, then in and through the building and where he then comes to for instance some etched glass by Chris Ofili casting shadows he reacts at that point in his score with appropriate percussive music of ride cymbals and wood blocks representing glass and the structural frame of the window panes. David said that the music did not necessarily represent

the architecture to him but over time it did and to others, as for instance in the Oslo Peace Centre, where Peter's music has become embedded in the ever updating soundscape people say that they cannot imagine the space without Peter's music. David said it was like the chicken and the egg: which came first? – the architecture or the music becoming inseparably entwined?

Wood, Adam. (2017). 'The Elephant is the Room: Sociology and Architecture'. *The Sociological Review*, 30 June.

As with Beaman and Smith (above) Wood advocates a case for a greater involvement of sociology with architecture, using concepts like semiotics of housing and 'fetishisation of space'.

World4.eu. (2018). 'Byzantine costume history. 5th to 6th century'. *World4.eu*. Available at: http://world4.eu/byzantine-costume-history-5th-century-fashion/#men-fashion-5th-century-8211-imperial-costume-and-the-nobility. Accessed: 28.03.2019.

Wray, Daniel, Dylan. (2018). 'Liberation Through Disobedient Noise'. *Loud and Quiet*, June. Available at: https://issuu.com/loudandquiet/docs/loud-and-quiet-125. Accessed: 27.10.2018.

Ledgard of the band *Ill* says 'Community is really, really important and more people are noticing that now. There is a huge sense of community that comes from music – from different scenes in different cities – there's a support network.'. Quoting Wray about another band member: ' Shanahan says that if *Ill* can make someone feel even a little bit empowered then their work is being done. "It's about being a cog in a larger machine says guitarist Tamsin Middleton, with Shanahan concluding: "We're not going to change the world with a song, we're not that naïve, but even venting a bit is good for you – you'll live longer. It's medicinal catharsis we are giving people."'. The relevance of these quotations is that where to date architectural quotations have been given, at the end, a summation as to the worth of this research will be sought, musically, and if the conclusion is only as per *Ill*'s then that will be something. *Ill* being in Wray's words 'a jagged post punk, clattering psych rock, acid glam, riot, grrrl snarl and doom pop, all loaded with political bite and ink-black humour.' band.

Xenakis, Iannis. (1992). *Formalised Music: Thought and Mathematics in Composition*. Revised edition. Additional material compiled and edited by Sharon Kanach, Harmonologia Series No. 6. Hillsdale, New York: Pendragon Press.

Xenakis, Iannis. (2008). *Achorripsis (1956-7), Orchestral Works, Vol. 5 – Metastaseis / Pithoprakta / St/48 / Achorripsis / Syrmos / Hiketides Suite*, 01 January, Arturo Tamayo, Orchestre Philharmonique du Luxembourg. Available at: https://www.youtube.com/watch?v=7yhONJvZthI. Accessed: 13.03.2019.

Yseult and Abib. (2017). 'Terry Smith'. *Folkestone Folks*, 08 March. Available at: https://folkestonefolks.com/2017/03/08/terry-smith. Accessed: 01.11.2018.

I have met this artist before and seen a video of people singing where one female sang to a wall, possibly this was shown on TV; he showed me around his studio which had glossy books; the impression I gained was that he had written the books or contributed to them; an art work on the wall which someone composed some music in connection with; he has worked on performance art—in short I am left with an impression of someone slightly mysterious yet somehow credible—I hope to interview him about the connection between music and art and especially buildings, architecture.

Yoko Ono Quotes. (n.d.). BrainyQuote.com. Retrieved October 13, 2018, from BrainyQuote.com Web site: https://www.brainyquote.com/quotes/yoko_ono_584417.

There are more excellent quotations of hers here which I may use as a running theme.

Zaha Hadid Architects. (2013). Serpentine Sackler Gallery. Available at: http://www.zaha-hadid.com/interior-design/serpentine-sackler-gallery-2. Accessed: 24.11.2018.

Zevi, Bruno. (1994). *The Modern Language of Architecture*. Da Cao Press Inc.

Quoting from the amazon.com summary, Zevi codifies seven principles or 'antirules' from the architecture of Le Corbusier, Walter Gropius, Mies van der Rohe and Frank Lloyd Wright, as replacing the Beaux Art school's principles of order, proportion and symmetry, as 'communication characterized by a free interpretation of contents and function, an emphasis on difference and dissonance, a dynamic of multidimensional vision, and independent interplay of elements, an organic marriage of engineering and design, a concept of living spaces that are designed for use, and an integration of buildings into their surroundings.'. Moreover, Zevi argues for complexity and, essentially, the textual deconstruction of structuralism or post-structuralism.

Zijl, Johannes Van. (2015). 'Bizarre Musical Instrument Plays Music Using Sea Waves'. The *Science Explorer*, 19 November.

As an example of eco and socially minded music, architect Nicola Basic designed a sea wall with holes in it to respond to sea wave pressure sounding like a piped instrument. The effect has been to help revitalise the sea front of Zadar, Croatia having been 'destroyed in the Second World War'.

APPENDIX A

Transcript of interview with Andrew Clague, head architect of Clagues, 62 Burgate, Canterbury, Kent CT1 2BH held at Clagues from 9.45AM to 12.30PM approximately on 12th November 2018.

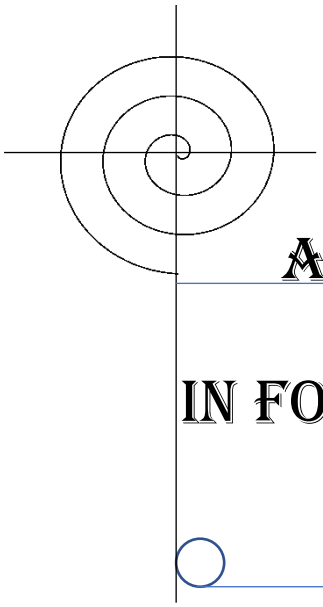
(yet to be inserted)

APPENDIX B

(Interview with Matt Lewis awaited, 14th November postponed—carried out 10th December 2018).

(yet to be inserted)

APPENDIX C



AN UNKNOWN BUILDING

IN FOUR PARTS:

PART ONE

By GRANT GOVER

For Quartet

2 Violins

Viola

Cello

Originally for *Ligeti Quartet*

In one movement

Duration approximately 3 minutes

Date 13.11.2018

Philosophy~background

Forming part of a PhD in making music out of architecture, this is a photograph taken during the summer 2018 from a cafeteria area outside at the back of the Tate Modern. It is a building with a Wagamama and Carluccio's, but apart from that it is hard to find from Google maps. The aim is to demonstrate that music can be made in at least five ways from architecture. This is an experimental way similar to one introduced during a recent masters at Canterbury Christchurch University (CCCU) where a collage of photographs was used to form a graphic score with score markings made using special pens and players were asked to interpret the space between the images and the indicative notation. Here players are asked to interpret electronic lines superimposed upon a copy of the photograph. I am particularly interested in the relative anonymity of the building, the fact that surroundings form part of the architecture, the reflections mimicking layers, moods and repetition, foreground with structural bars at interesting perspective angles forming bold statements with similar angles reflected in the background, sundry objects, people fencing swings and trees in the middleground, the regularity of windows, vertical glazing members like musical bar lines slightly offset, concrete floors demarcating layers in a different dimension to foreground middleground and background, the play of light and sky.

Player collaboration

Zubin Mehta gave an illustrated talk at CCCU on 29th March 2018 where he made a plea for performers who contribute to scores to be recognised. I agreed at the time and wish to take up his banner. There are difficulties with this to do with authorship, tradition and royalties some of which if followed through could present quite legal and technical challenges. Another difficulty is that players frequently wish for direction and in effect do not want the freedom to make choices, especially during busy rehearsal and playing times, which is understandable.
In this performance I would request that players collaborate and add their own interpretation, as Rink, Cook, Clarke, Ranmarine, Leech-Wilkinson
and others found out in the AHRC Research Centre for Musical Performance as Creative Practice (2009-2014 and 2015 report):
http://www.cmpcp.ac.uk
and the Durham university experiment:
https://www.dur.ac.uk/music/research/projects.

Playing instructions

These are given on the following page. It will be seen that parameters of pitch range and overall time are indicated. Other parameters of timbre, method of attack, dynamics, note duration and other parameters are left to players to decide.
This is an experiment that if players 'buy into' should provide an interesting result, with an element of chance both for individual players in the moment and for the ensemble as a whole. Ideally, players will be able to literally 'translate' the building and its accoutrements, the ancillary appendages such as fencing swings and other objects, also a feeling for the materials, the architecture itself.

Playing instructions

Each instrument has an indicative line shown coloured.
From the top:

Cello: — (purple)
1st Violin: — (magenta)
Viola: — (cyan)
2nd Violin: — (yellow)

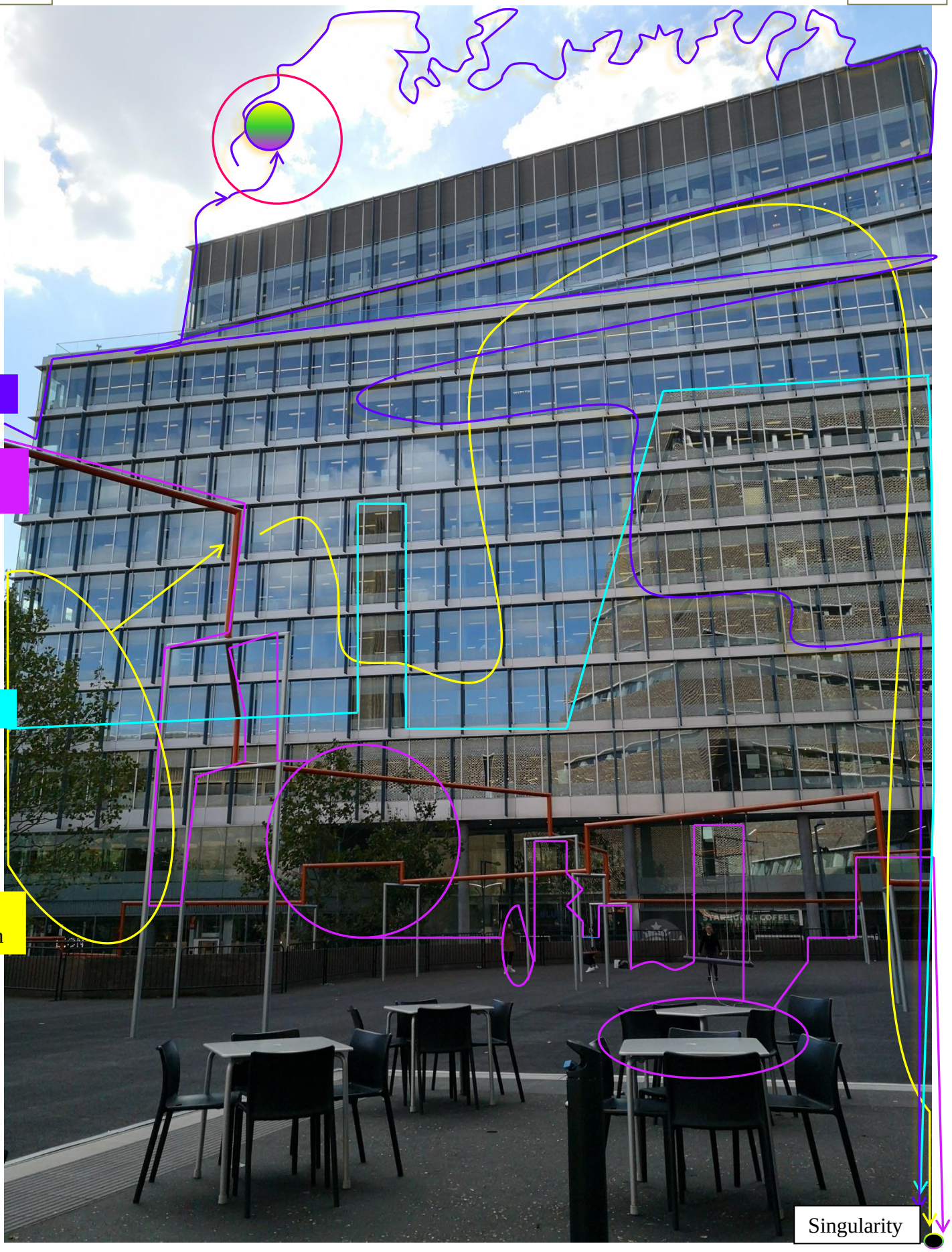
Pitch: choose arbitrarily a starting point allowing sufficient room to reach the high and low points relatively. The actual range is your choice. Do not worry if your pitch clashes with another's pitch, but listen to the other players—possibly by half way you will start to synchronise in some way, tempo-wise, harmonically, timbre-wise and so on.
Tempo: do not rush it, but if you feel like making a dash for it, adding a flourish at any point then do so. The tempo should determine itself. If in doubt start at 8o m.m.
Roughly follow each path, deviating if wished to follow lines of windows or other path/s of own choosing, trying all the time to describe what you see as an element, member, or material part of the building or its surrounding. Even if you lose your place, cannot distinguish the colour from the background, do not worry, follow your instinct. Try to onomatopoeically describe the sound of glass, sky, tree, tarmac or whatever material you are passing over—even if it does not sound like it, try to think of the material.
Break up your path into segments, being notes, individual notes, joined notes, slurs, with spaces, rests as you feel necessary.
Place the bow in one of six positions as you think at the time best suits the mood:

1. Just by the head stock
2. In the middle of the finger board
3. Near the end of the finger board
4. In normal position
5. Just before the bridge
6. Just behind the bridge

Bowing up and down strokes is totally up to you.
Texture: try to use a range of bow pressures and bowing types, such as premuto, flautando, normal, legato, detached, pizzicato, bouncing on the strings, but not in an obviously flashy way—simply how you think it is needed at the time. If in doubt just caress the strings with long sensitive bow strokes.
Dynamics. It would be nice to have sudden changes of dynamic from soft to loud and back again and possibly out of phase of one another, always thinking… If in doubt, stick to the quiet silvery sound world.
Start from the left hand side of the page and work to the right. The overall duration is set at roughly three minutes as per the brief. This would not have to be slavishly followed, so everyone can finish at slightly different times.
Everybody ends at the bottom right hand side—in a singularity: what this means is up to you. Scientists, mathematicians and cosmologists are not sure what a singularity is—try to make your own mind up what it is—I would think musically it ends with the merest sound or silence—others may think it ends with a bang such as a loud pizzicato, or anything. If in doubt let it all taper away to nothing and then hold your position for a while before relaxing.
Thank you for having a go—and I hope you enjoy it.

START

FINISH



Pitch

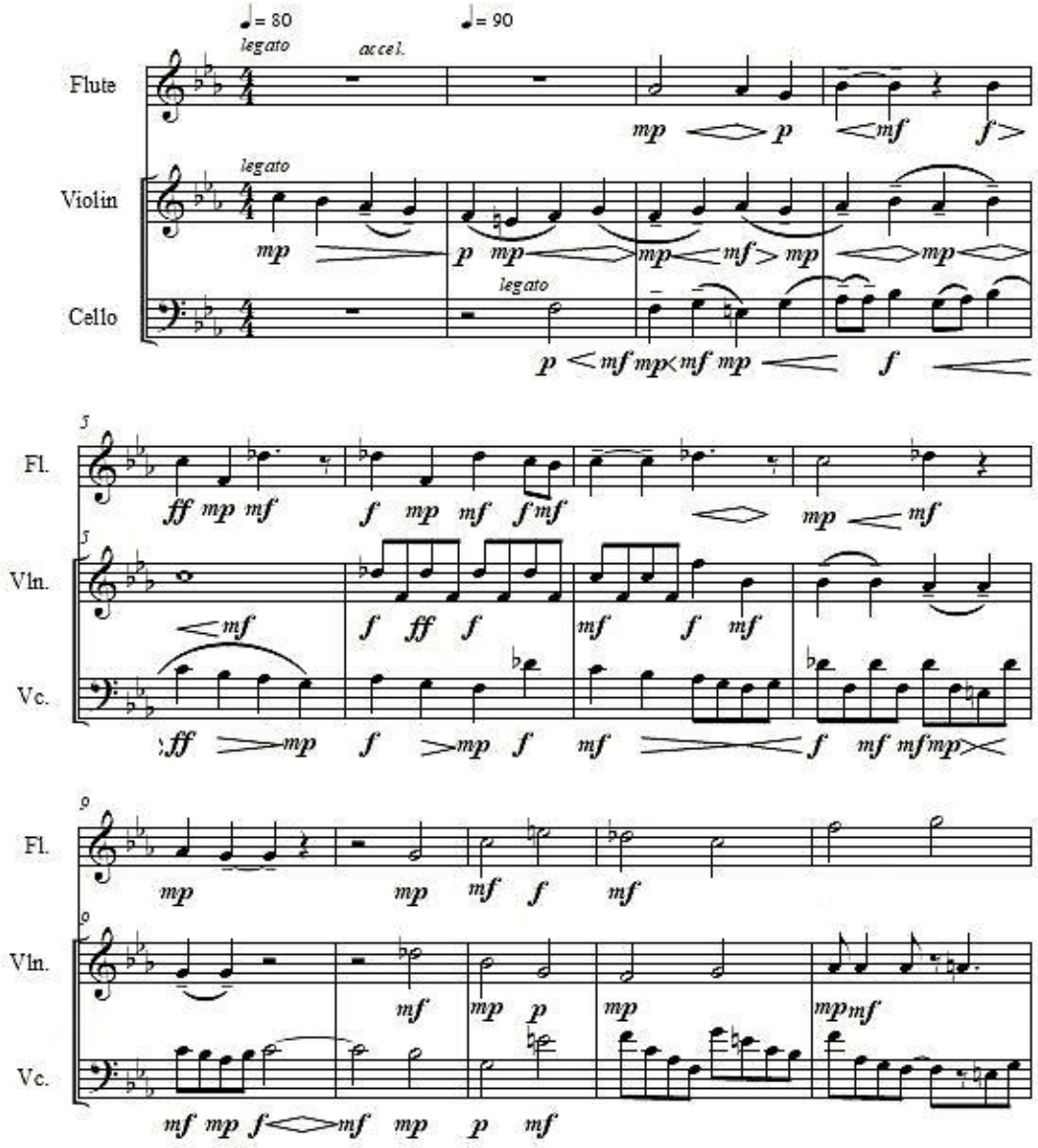
Time

3 minutes approximately

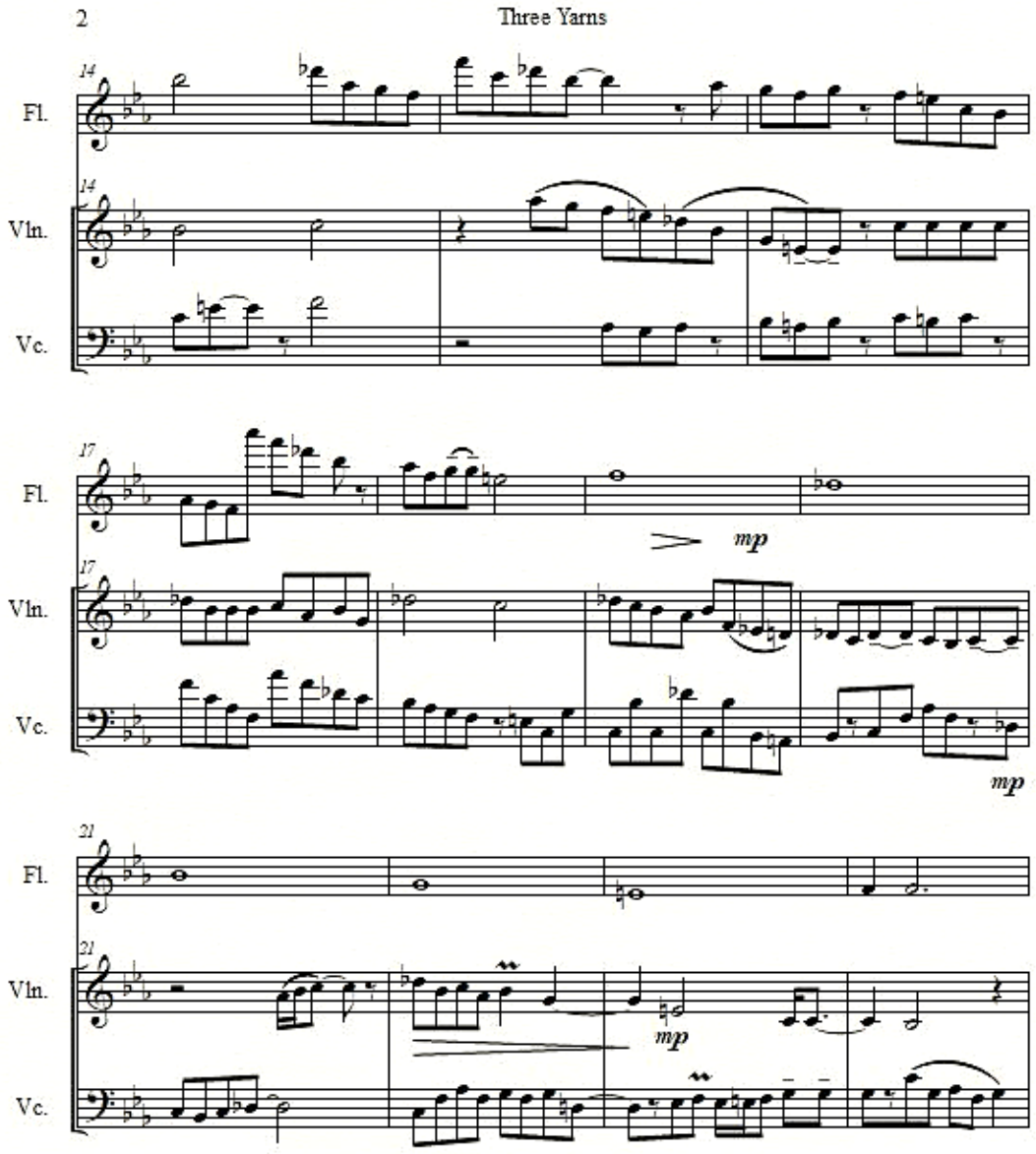
Three Yarns

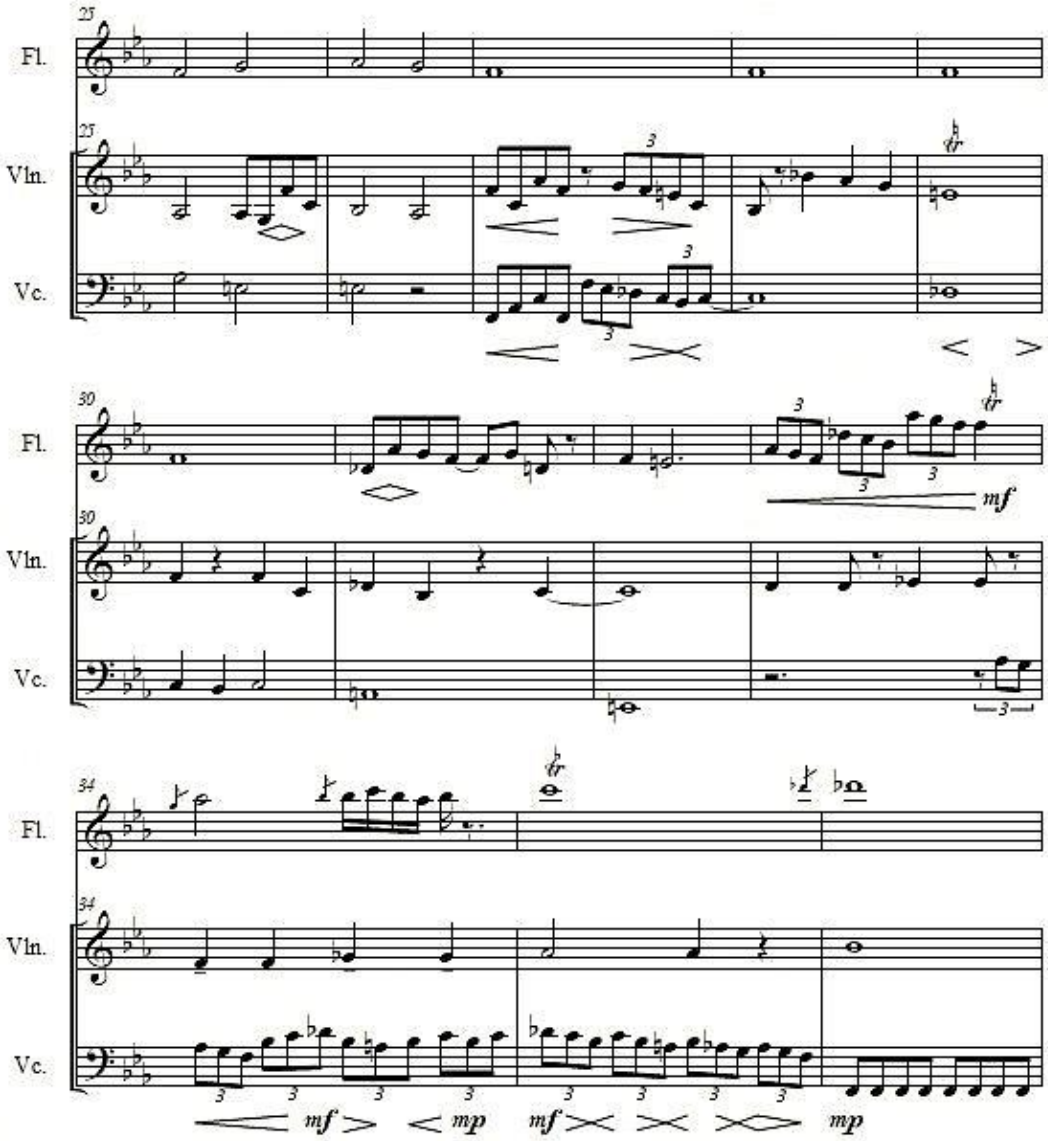
Blue, Yellow, Red

Grant Gover



Appendix D

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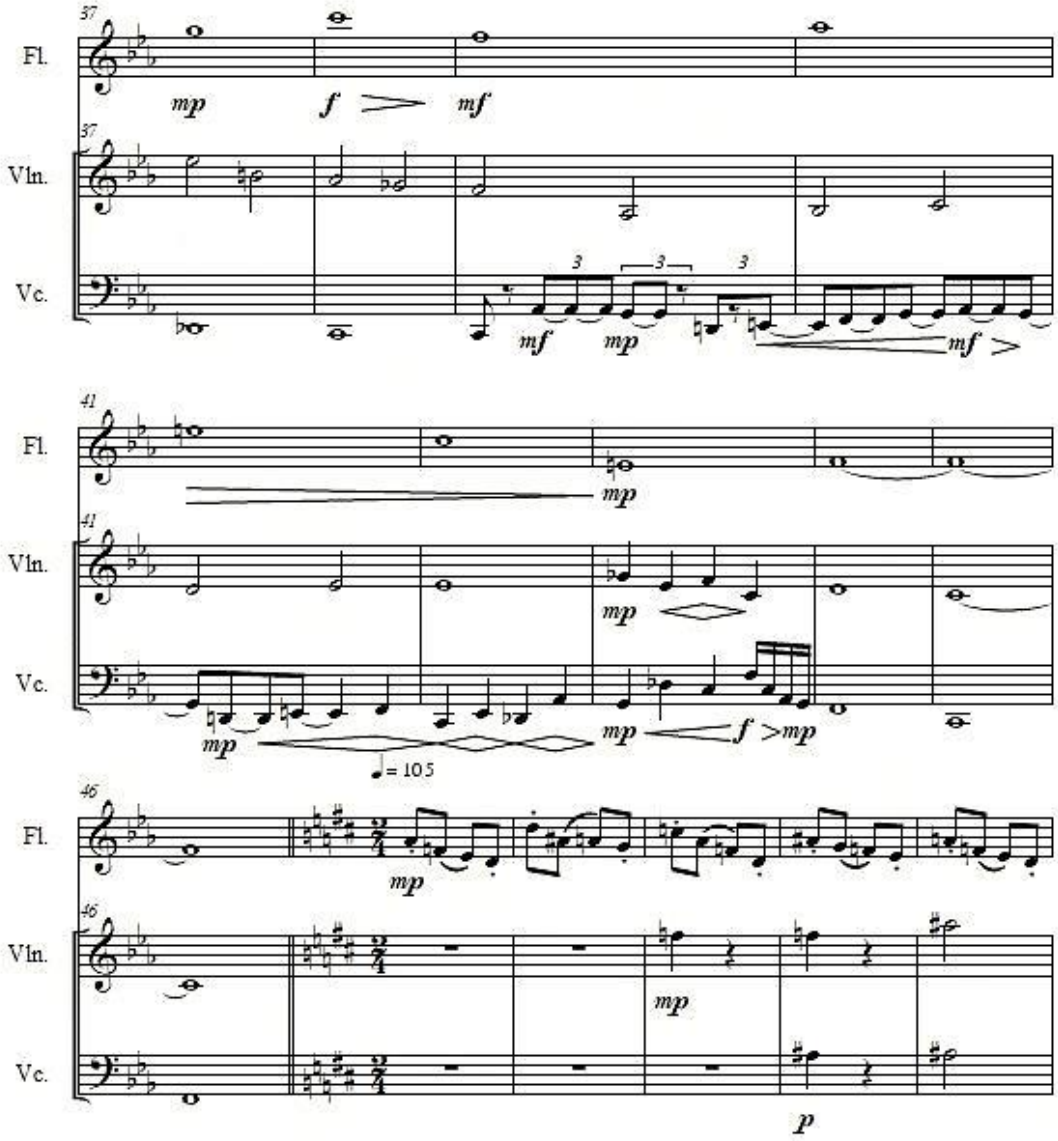
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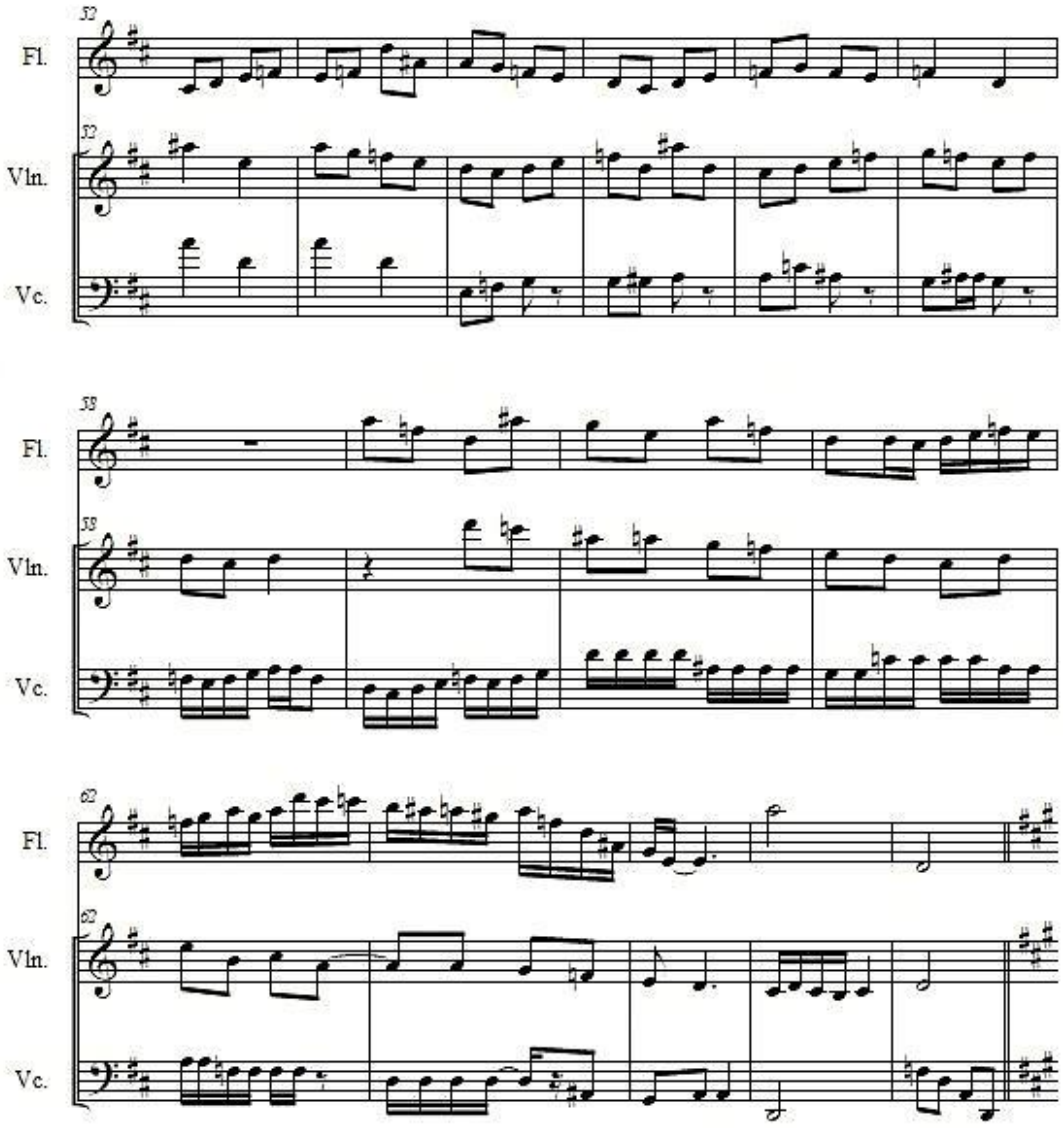
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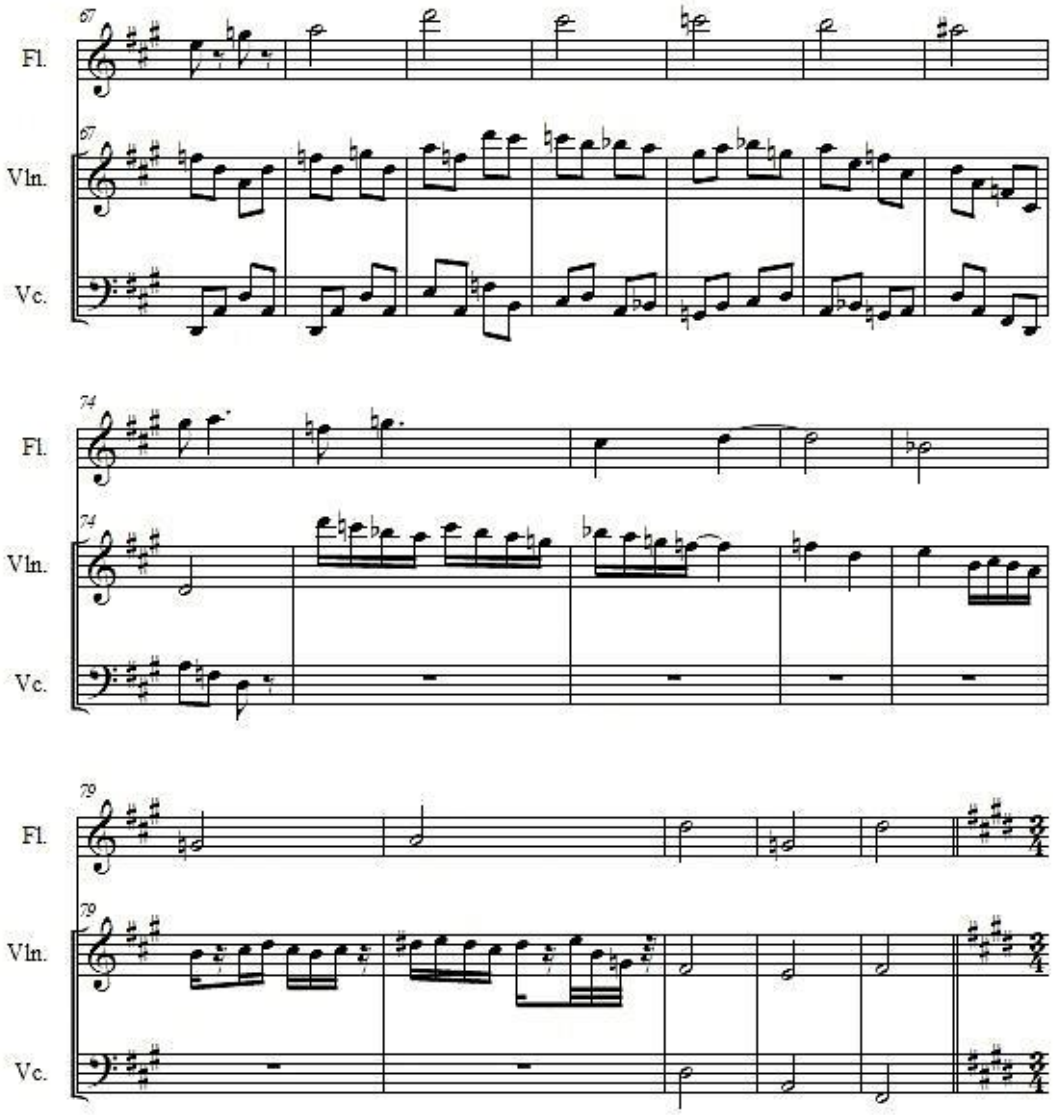
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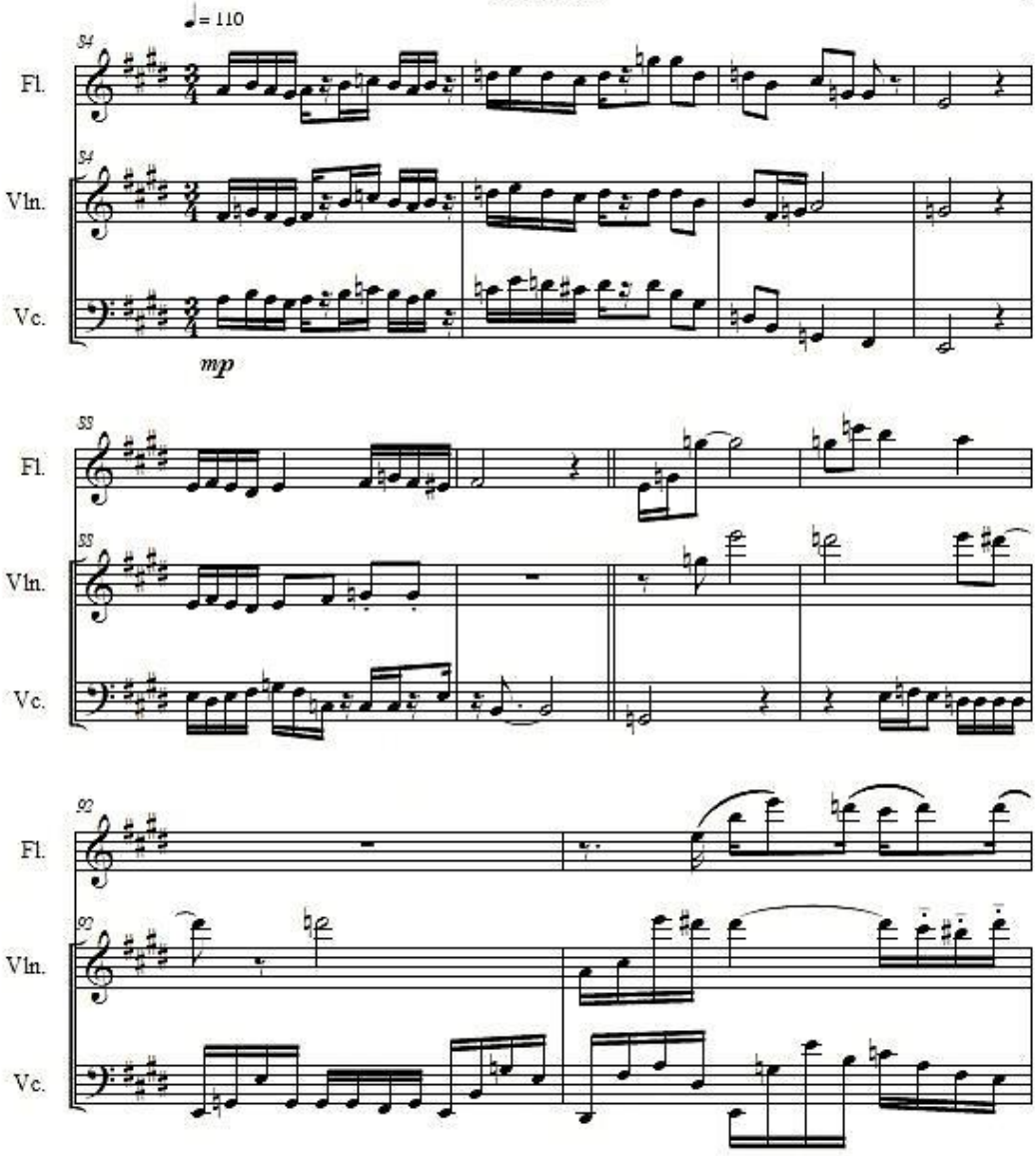
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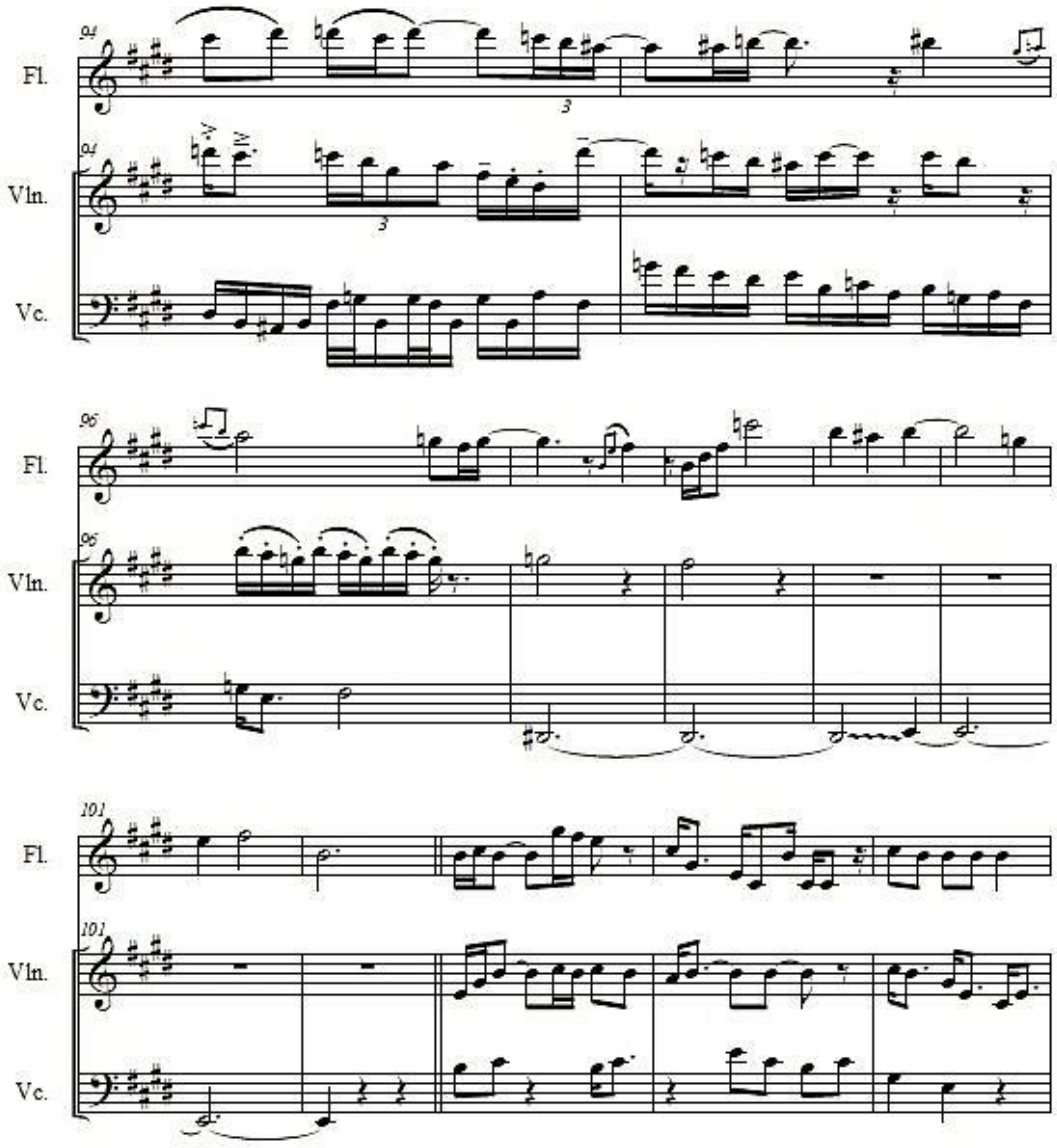
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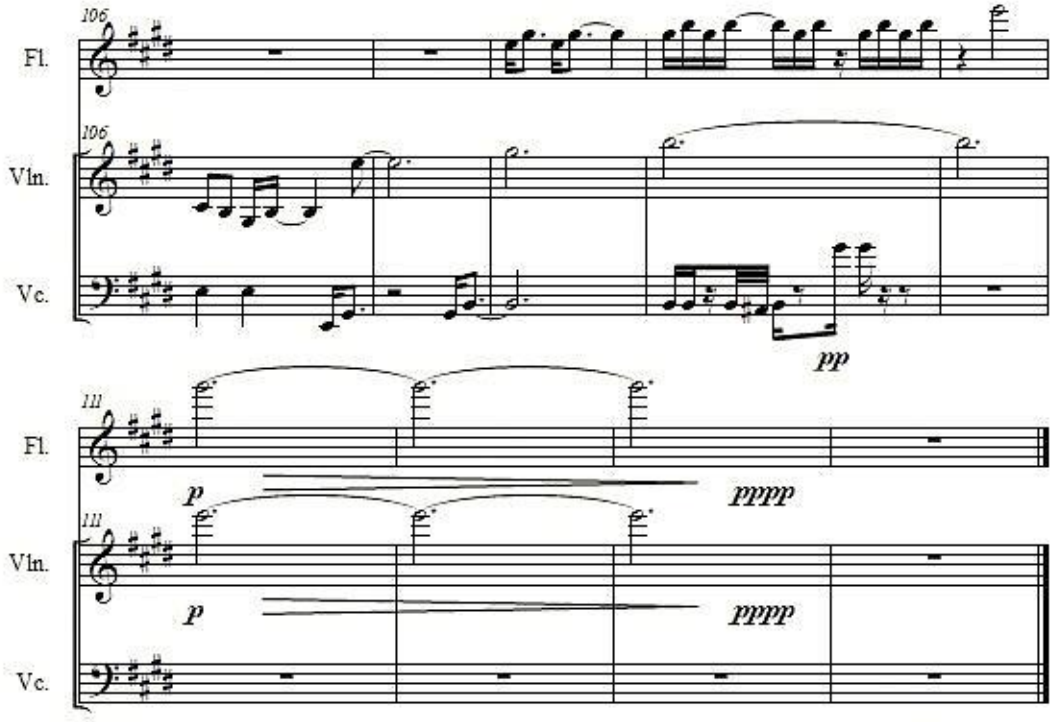
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Appendix E

Mies van der Rohe Carr Chapel, Chicago, Illinois, 1949-1952.

An architectural appraisal in connection with a separate musical appraisal (not included here–see: Burton (2018) for the musical interpretation and explanation).

archiseek, 2009

photograph 1: Carr Chapel, Chicago, Mies van der Rohe, 1949-1952

In association with a musical appraisal carried out separately, this paper seeks to appraise the Carr Chapel from an architectural point of view.

The Brief

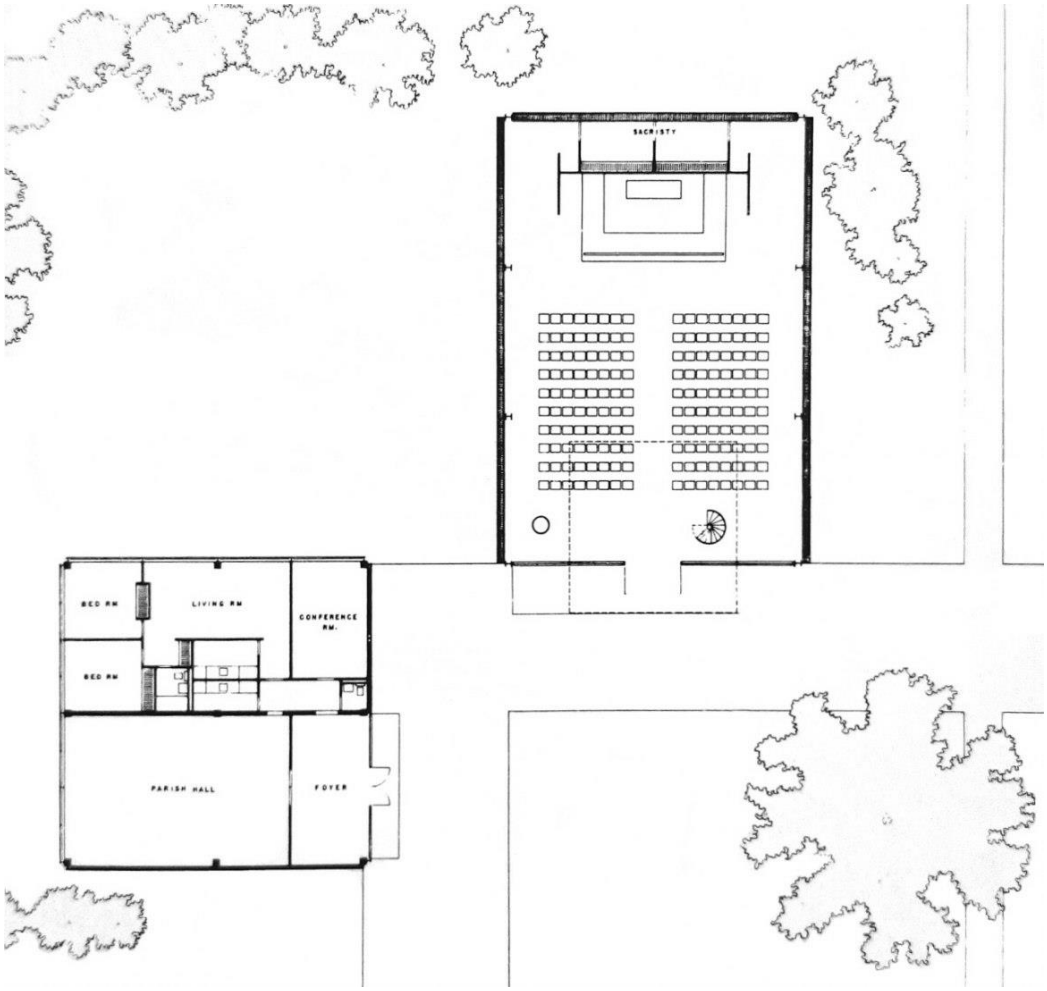
Apparently, the building was commissioned by Conkling E. Wallace, Bishop of the Episcopal Diocese of Chicago (*wikiarquitectura*; Pérez, 2015), as an attempt to make some reparation of anti-religious feeling after World War Two. He proposed the location of the Illinois Institute of Technology (IIT) as suitable, being in the heart of where students learn about modern technology (*wikiarquitectura*; Pérez, 2015), and in the 'atomic age' (Knoll, 2018). At that time the IIT was involved in technological efficiency for the war effort; since then it has gained in architectural prowess as a

legacy of Mies van der Rohe, especially with the S. R. Crown Hall built in 1956 on the IIT campus (Society of Mies van der Rohe, 2016). The name of Carr comes from Robert F. Carr (February 1st 1931-18th May 2018*)* (Dignity Memorial, 2018) who possibly put up the remainder of the money where the word 'Memorial' in the building title probably refers to such funding, since Robert F. Carr only died in 2018 and would have been very much alive when the building was commissioned. In a way, Robert F. Carr echoed the founding situation, being a military person, of high rank, most of his working life, yet with a connection to the Episcopalian church (Dignity Memorial, 2018). Whilst connected with the war in Vietnam there seems to be a peaceable element to his activities in decommissioning and helping to hand over helicopters to the Vietnamese army at the end of the hostilities. He might well have been more of a tactician and academic than a front line fighter. (Dignity Memorial, 2018).

The government had a hand in forming the brief, wanting the church to be open to all 'beliefs' (Pérez, 2015). The Mies van der Rohe Society (2016) called it 'the administration' that was responsible for this open remit. This could be implied to mean the IIT itself, although it is not unfeasible to think of some government pressure being brought to bear. The source *wikiarquitectura* uses the word 'faiths' instead of 'beliefs', yet there is a disclaimer about the quality of translations in the document. This document seems to have some derived information and yet a feel that there is perhaps a then current student providing the information—this is conjecture, but it does seem to have some reliable information and useful photographs. 'Faiths' implies religions, whereas 'beliefs' implies a wider set of possible belief systems, including all or none. It is still called a 'chapel', implying some sort of religious use. The original proposal and plans drawn by Mies van der Rohe include a 'complex' of a 'parish church, a chapter-house and a chapel.' (Pérez, 2015), which definitely indicates a religious intention (*figures 1& 2*). This is borne out by drawings some of which are shown here (in *metalocus,* Pérez, 2015). Pérez (2015) suggests that the government was responsible for cutting down to one single building, 'although there is no proof of this in the archives'. So, whether, the smallness of the project was as a result of politico-religio pressure, or Mies wanting to apply his famous motto "less is more" (Pérez, 2015, Burton, 2018) may be conjecture, but Mies did say in relation to this project, according to *wikiarquitectura* and borne out by The Mies van der Rohe Society (2016):

[It] was not meant to be spectacular [, it] was supposed to be simple, and in fact, is simple but in its simplicity is not primitive, it is noble, and its smallness, is great indeed monumental… (Mies van der Rohe).

Jentes (2010) in her role as the Mies Society Director, as in 2010, endorsed much information in this paper, including saying that the church's importance had grown to be daily in use as a spiritual place for Protestants, Catholics, Jews, Muslims, Hindus, Buddhists, pagans, secular humanists, Baha'i, Sikh and others.



Metalocus

figure 1: Initial Plan for Carr Chapel, Mies van der Rohe, 1949-1952

Whether there is any significance to this or not, but it is noticeable that where, obviously in subsequent improvements, a security light, or some sort of simple

overhead light, has been added over the main entrance, as in *photograph 1*, the sketch below indicates a cross. This surely is more significant, rather like a Lutyens post, which is a drawing together point of significance, a plain adornment that can embellish a rooftop without over-the-top decoration. Here the message is plain, a simple cross. Whilst the light fitment has obvious utilitarian, and with modern day health and safety, considerations in mind, there is a crudity of an industrial type lamp instead of a bare cross against the skyline.

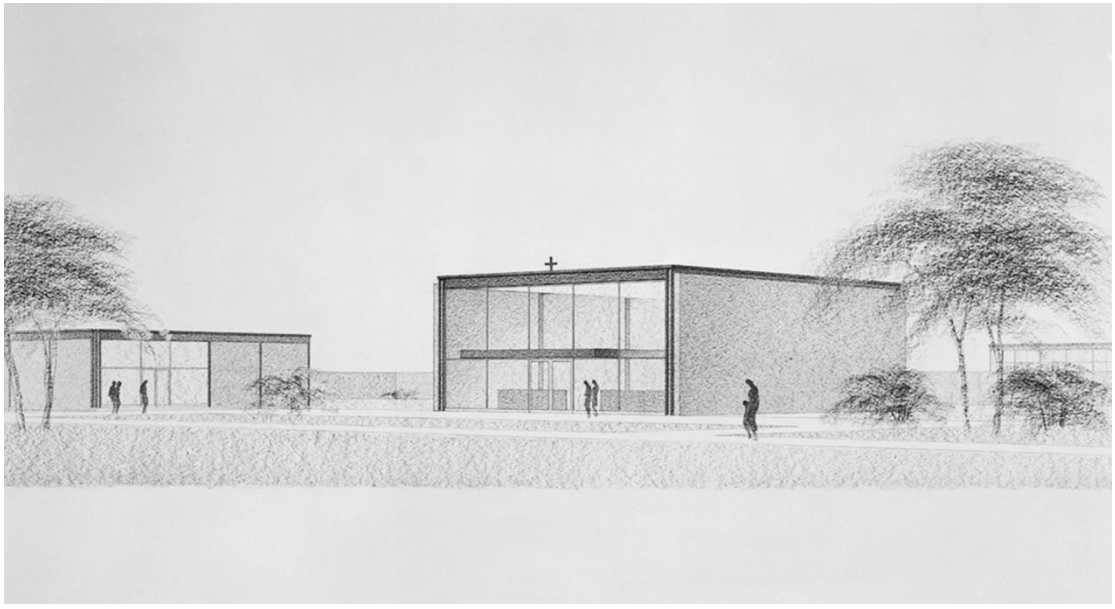


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figure 2: Initial sketch of complex, Carr Chapel , Mies van der Rohe, 1949-1952

Furthurmore, even though the inside has been modified somewhat, by later repairs (2008-2013) (*wikiarquitectura*; Pérez, 2015) (2008-2014: IIT, edu. Paul V. Galvin Library, undated) with additions of toilets (Pérez, 2015), the essential layout of altar and cross have remained, which are crucially religious. Both sources, *wikiarquitectura* and Pérez, state that the cross and curtain were toned down in significance due to the government interference. According to *wikiarquitectura* the curtain was ‘controversial’ and used to hide items of religious reference.

A preliminary sketch from the *Metalocus* source via Pérez (2015) shows a greater prominence of the internal cross (*figure 3*).

Whether there is anything to this, the altar table looks like a bench, which the *Archiseek, 2009* photograph above shows as outside (*photograph 1*). Is this bench a reflection of the altar inside, yet a later addition?

Mies van der Rohe apparently wanted to design a cathedral; this was never realised (Knoll, 2018). It is fair to say, then, that he intended some religious signification to this building. The Mies van der Rohe source (2016) states in connection with the use of brickwork, apparently Mies's only use of brick on its own for a wall—that is as a supporting structural element, as well as an enclosing envelope to keep out the weather, as well as look nice—was meant to 'draw the eye upward, making the Chapel a place for contemplation'. Furthurmore, unlike as with a cathedral, Mies did not want to encourage 'a longing to become lost', but 'that visitors would feel "the hope of finding oneself" in the small space.'.

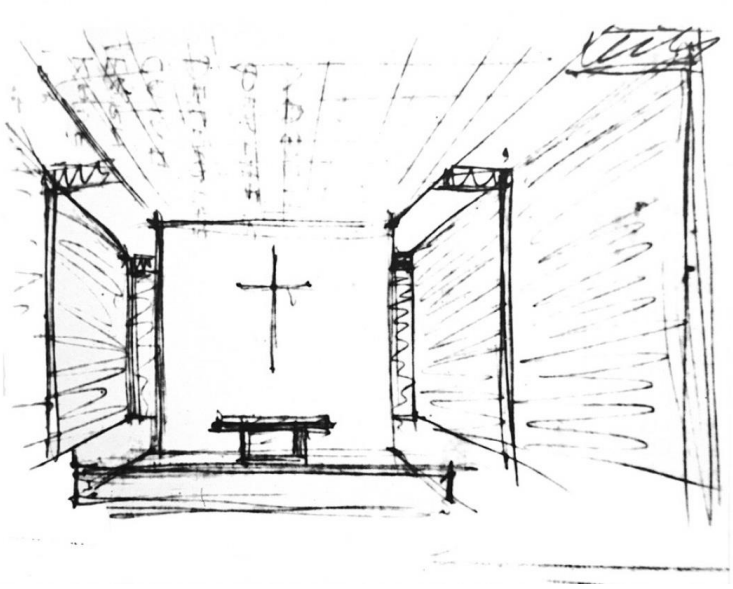

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figure 3: Sketch, Carr Chapel, Mies van der Rohe, 1949-1952

The repairs and alterations that both sources (*wikiarquitectura*; Pérez, 2015) mention consisted of complete roof renewal, the glazing and framework, rebuilding of brick 'corners' or quoins, the 'renovation of the terrazzo floor', cleaning and repair of internal brickwork, work to heating and electrical systems, including new lighting, air conditioning and the toilets as mentioned. The cost was in the region of $1 million and was carried out by Harboe Architects (*wikiarquitectura*). T. Gunny Harboe taught

at IIT and involved students, the 'Faculty of Architecture Dean Donna Robertson and other officials of IIT' as well as the Mies Society (*wikiarquitectura*; Knoll, 2018). It is then apparent that the architecture of Mies and especially of this chapel was held in such high regard as to warrant this expenditure. Indeed it was celebrated on 21st October 2014, with a rededication ceremony, including T. Gunny Harboe, the restoration architect, a Mies van Der Rohe society board member, Barbara Donnelley, Lyn Meyer, spiritual director at IIT and Aron Dunlap, an assistant professor at Shimer college, ending with a concert by the Civitas Ensemble and a reception (Knoll, 2018). This vouchsafes the esteem and religious credentials of the building. According to Katrina Burton (2018), Mies said that he 'designed it for the students and staff at the school' and that 'they will understand it'. They obviously do and so do many more, including Katrina Burton and the visitors to the Access Contemporary Music and Open House Chicago scheme (2015), who heard music evoking the chapel (Burton, 2018).

The Architecture

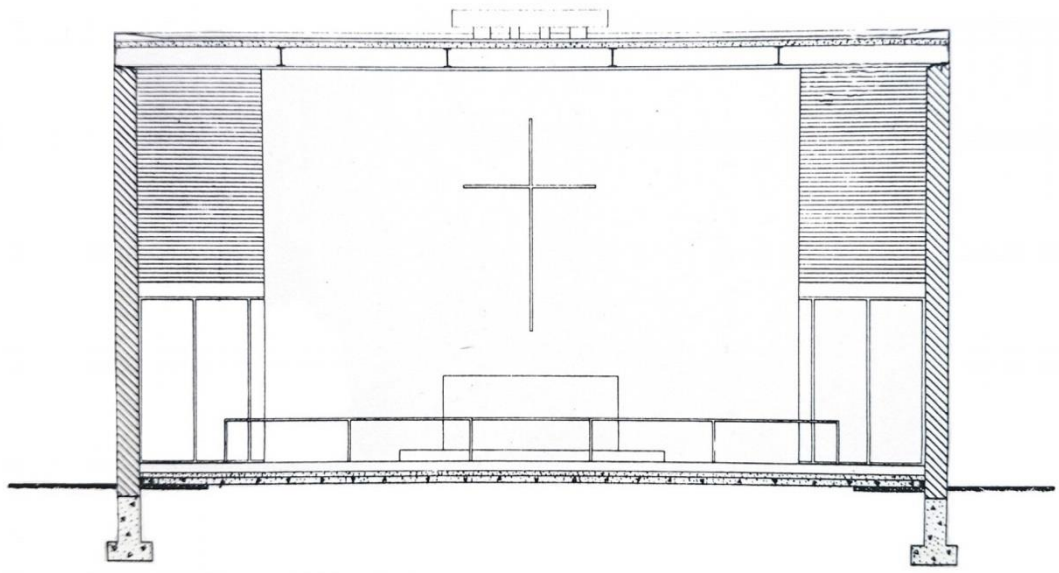
This critique is a personal response to the imagery and information available. Starting with some negative points the intention is to end with celebrating the building as Katrina Burton does (2018). In fact negative points soon turn to positive points of admiration. There is an integration, that where there are any negative points, they soon turn to positive, in the same way that IIT Mies admirers are prepared to pay a substantial sum to restore and upgrade a relatively small building. There is something about this building, that despite any faults it is in the final analysis impeccable.

One of the first points noticeable is the roof flat with the flush fascias or eaves (*figures 4 & 5*). Normally, an overhang and careful detailing is required here to avoid damage from rainwater. In fact, the rainwater is channelled to the front and must simply drip down the front façade. Mies does say "God is in the detail" (Perez, 2015). The design is simple, which would not meet modern standards, or codes as they are called in America, but of course they were sufficient for the time of construction.

The Society for Mies van der Rohe (2016) as well as the Director, as at 2010 (Jentes, 2010), give an account of Mies's design principles as evolved in the USA, since leaving Germany and the Bauhaus, as largely in line with the Carr Chapel. He evolved a formula of using glass, aluminium and steel framed construction, with an emphasis upon materials, constructional details where sometimes, in effect, form followed function. He is quoted (Mies Society, 2016) as saying "Form is not the aim

of our work, but only the result"; on other occasions he would take a functional approach, and on another a plainly aesthetic approach such as with another development 860-880 Lake Shore Apartments of 1951 where he inserted technically redundant I beams welded to mullions simply because they "looked right" (Mies Society, 2016); he was concerned with modularity, grid layout, adhering to 24feet by 24 feet by 12 feet or some near arrangement based upon those dimensions, largely avoiding more than one storey to avoid the Chicago fire codes, and a master plan where buildings were offset to create interspersed green areas (Mies Society, 2016). Jentes (2010) encapsulated this concisely as:

> Mies created the Chapel with the same simple materials he used in the rest of the IIT campus: brick, steel, glass, oak panels, travertine marble, and terrazzo floor. It is in keeping with the "skin and bones" style for which he is known, where Mies tries to pare down the structure to its most beautiful, bare essentials.



metalocus

figure 4: Early section, Mies van der Rohe, Carr Chapel, 1949-1952

Other points emerging from this cross section highlight Mies's simple approach and love of symmetry (Summers, 1996 in Mies Society 2016). The foundations are simple strip form concrete with below ground walling as one monolith. The flooring looks simple, as planks laid on the ground, with the terrazzo laid on top and with possibly some form of insulation adjacent to the walls. The walls are simple 9 inch brickwork, in English bond, probably for both strength and looks.

The colour as visible in several drawings shows a matching to neighbouring buildings and in fact is possibly one of his favourite colours because he has used a similar colouration elsewhere, for instance in the Lemke House of 1932 in Berlin, Germany (Mies Society, 2016). The colour is warm and almost 'pretty' showing Mies's heart and courage where it is widely noticeable that architects for whatever reasons often choose harsh coloured bricks. *wikiarquitectura* comments upon the interior's division into a series of 'spaces articulated by different transitions, a step in the terrazzo floor, stainless steel railing', the arrangement around the altar, which has a plinth and the other accoutrements described elsewhere. This transition actually carries on to the outside step which is a precursor for the step and plinth inside.

The detailing of the floor and glazing is both simple and appealing. The floor has an arrangement of composite concrete and screed with a joggle joint to help tie in the external front base slab with the external apron step on top, with some insulation. The brick side window fixings are straightforward. The vertical window fixings seem almost naïve in their simplicity. The bottom one seems to be in a position where it would be prone to rust. The glazing is single. Perhaps in the replacement they are double. Perhaps to be really prescient they could be triple, but then one would need to take into account the prevailing internal and external environment. The detailing is of square fillets of timber or aluminium with beading both sides, a minor detail of symmetry. The window system, like the top roofing detail, the 'cap', is flush with the outer face of the brickwork. There is no set back to create a shadow line or provide any relief from the weather. It works, but does it? It works visually in its elegance of simplicity. But, the whole glazing had to be replaced in 2008. At the roof level the internal junction with the wall seems a suspect case for condensation.

Apparently, the whole roof had to be replaced, but the new roof does not show any internal insulation at the perimeter, yet the existing design did show some insulation on top of the concrete pots which lie across the tops of the joists or I beams, thus creating a 'warm roof', perhaps an early example of such. The pots seem to be just butted up against eachother without any grout in between. This would accommodate some movement which has always got to be allowed for since all materials expand and contract with temperature differences. Such pots with downstands abutting, especially when jointed with grout, form Tee beams with central sections acting as cantilevers. This can be quite strong and allow for carrying loads such as snow. All the sections seem quite slender, but in all the photographs the structure looks intact. The new works would in all probability have involved new

structural calculations, so this is a groundless concern. The finish to the roof steelwork is quite simply lovely and would without doubt be something that would have pleased Mies van der Rohe. The jointing or welding is hidden and as such does credit to the roof design. The getting away with not adding any further embellishment except for lighting and somewhere, not easily visible, some air conditioning, seems to be in the spirit of Mies's "less is more", his sparseness.

Incidentally, the arrangement on top of the roof seems to indicate an extractor of some sort, so possibly Mies did think of air extraction, a ventilation system of some sort. This would justify a later addition of an extractor as part of an air conditioning system to be placed on the roof.

To then consider the repairs and renewals, from the point of view of what is left after all is stripped out, there is a bare shell. So, this comes back to the magical decision to retain what is left and then renovate, replacing where necessary, what Mies first envisaged.

Firstly, there are two minor points that are obvious when looking at the repairs carried, to the brickwork bonding of one corner, on the front right hand side, and untidy marks left on the brickwork to the other front corner. These are shown below.

There is a straight joint at the top on the left hand side of the right hand quoin, to the 4th, 5th and 6th joint. A purist about detail such as Mies may have worried about something like this where the bond does not work out exactly. In his favour the bond, the layout of the bricks for the openings, here of the front window and door assembly works out perfectly. This is surely the mark of an architect who thinks about details. However, the Mies van der Rohe Society historical survey with comments (2016) shows that Mies could be cavalier at times, which only goes to show his humanity. Despite being a fastidious perfectionist, he could still drop his guard and come out with a surprising design detail. As a musical corollary, it is like a composer who does not always compose as expected and surprises the listener from time to time.

metalocus

photograph 2: Straight joint detail to top left hand quoin, Carr Chapel, 1949-1952

metalocus

photograph 3:Mark to brickwork top left hand corner

To recapitulate the remedial and upgrading works carried out including adding in other items from all the sources (Jentes, 2010; *wikiarquitectura*; Mies Society, 2016), are:

New roof, including possible re-design or partial re-design
Clean underside of concrete roof pots (pleasing to the sight and adding light reflectance)
Internal brick cleaning and pointing (pleasing Jentes and others, 2010)

External brick cleaning and reconstruction of corners or quoins (with some reservations as pointed out above)
New glazing and front entrance complete (including the new configuration letting in more light and changing the look slightly, which some may think for the better)
New Electrical system, including new lighting
New air conditioning system (situated behind the curtain)
Removal of built up items barring sole light source from front façade
Removal of organ (The Organ Historical Society, 2016) which somehow appeared then mysteriously disappeared
Renovation of timberwork, doors (which must have appeared from somewhere over time), panelling (possibly as per the doors) and 2 No. side benches (probably original and 'floating' as Mies's original design)
Renovation of terrazzo flooring
Curtain renewal by Donghia Inc. donation as Italian Mies design
Creation of ADA (American Disability Act) compliant rest room and passageway and air conditioning

In today's terms that might be worth approximately $1,300,000. 'Lead gifts' were received from 'Barbi and Tom Donnelley, Colin and Tracey Kihnke, the Regenstein Foundation and Jane Moore Black. The initially 'controversial' curtain involved much work and sounds like a delightful detail in which Mies involved himself. According to the Mies Society (2016), Mies's assistant of later years, Gene Summers, personally oversaw the complete faithful remaking of the curtain, the weaving in Italy of pongee silk together with fire retardant fibres, sewing and pleating carried out gratis by Cornel Erdbeer, an obvious expert, all bringing the initial simplicity and textural 'palette' of the 'heavy silk and creamy' colour to match the Travertine marble of the altar and the masonry. If the curtain was initially to disguise any religious connotations of the Carr Chapel, there are numerous photographic records to show that the Chapel has been consistently used for services. According to the Mies Society, 'Since its completion in 1952, the Chapel has hosted a weekly service on Sundays, as well as weddings and a plethora of other events, both religious and secular.'. In this way, it would seem that it has met Mies's aims.

In answer to frequent questions, Justine Jentes (2010) sums up what the restoration was all about:

Donors are engaged by this project because they want to help provide a welcoming spiritual center for the IIT community and because they are intrigued by Mies' only religious building. IIT and the Episcopal Diocese built this Chapel to unify the realms of science and spirit. Restoration of the Chapel is a commitment not only to preservation of an architectural gem, but to the nurturing of students, faculty and staff as whole persons.

Perhaps to that can be added more people than just those associated with IIT, but a wider community reaching across the world. This little 'gem' as Jentes calls it is almost a miracle in itself, a mustard seed that continues to grow. Despite any design pitfalls, leading to the necessity for largescale renewal and repairs—although some of the works would be brought about by newer tighter regulations than were pertaining when Mies designed the building—the patent goodwill of everyone who seems to come into contact with the building, including those funding works that in many other similar situations would be ruled by a cost accountant or quantity surveyor as non-feasible, is miraculous. This little 'shoe box' with a tight fitting lid with windows cut in at one end somehow speaks for more than just a little building.

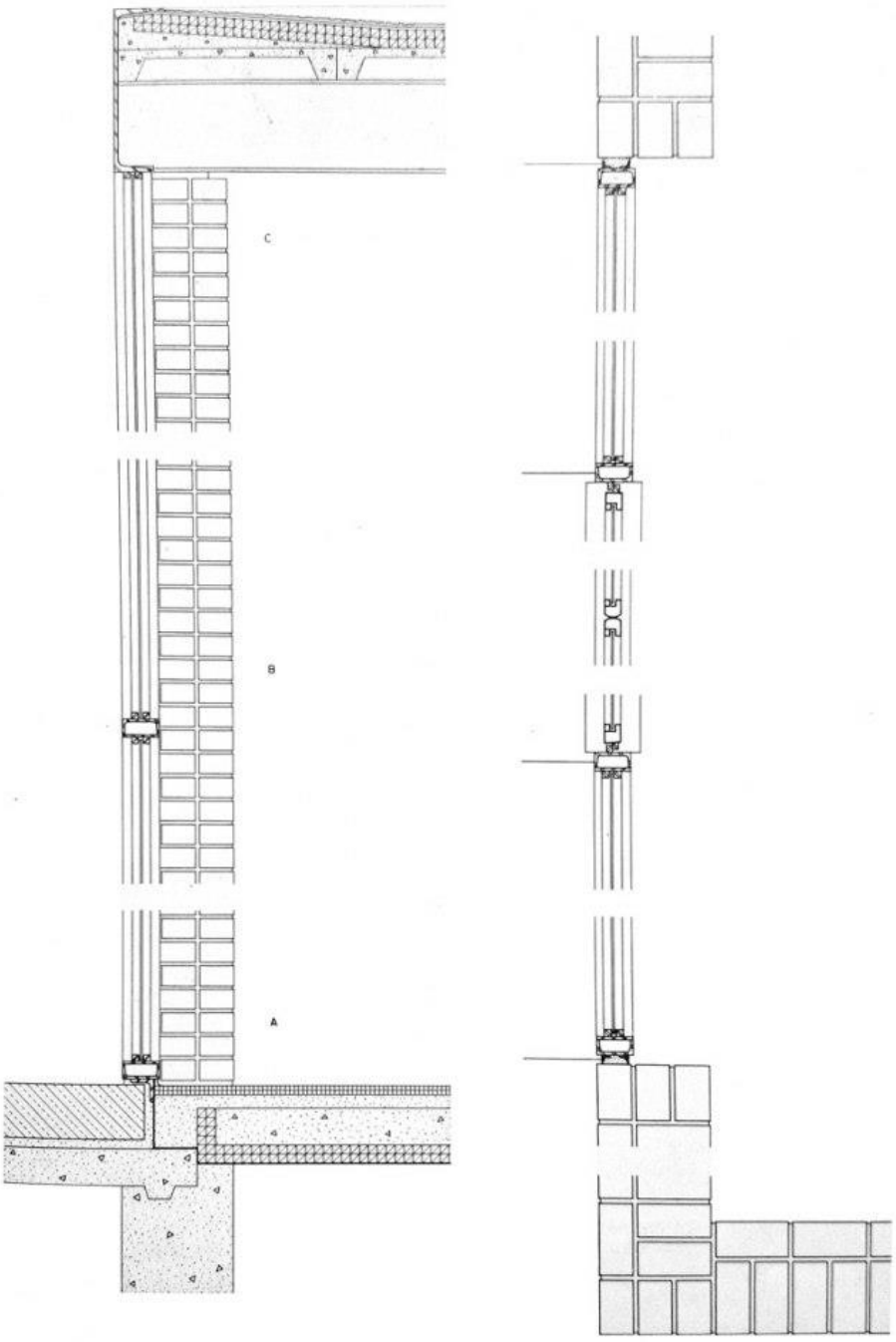


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figure 5: Early cross sectional drawing, showing roof, wall, floor junction and window details, Mies van der Rohe, Carr Chapel, 1949-1952

The overall effect is of a tight fitting lid that looks as neat as a Christmas or birthday present wrapped up by the nimblest of fingers. Another way of looking at this is as per the modern obsession with packaging (as evidenced by videos online of people undoing new manufactured items and celebrating the whole experience from taking out of the box) or precision engineering of a lid being able to neatly click tightly into place. The balance is remarkable. *wikiarquitectura* states that Mies followed the Golden Mean in proportions. Without accurate measurements this cannot be proven. However, visual inspection of the available drawings and photographs indicate a clear sense of proportion, which may well fit the Golden Mean, or perhaps in the Fibonacci form, of Le Corbusier's Modulator (Wiles, 2009) with whom Mies had some dealings (Mies Society, 2016).

There is an early photograph, as *photograph 3*, where there was an upper row of widow lights, not seen in the majority of photographs where the glazing was renewed. These taken, together with the lower lights and the remaining lights (window section as whole panes), the glazing sections (all the framework that goes to holding the glass in place), the entrance doors and its sections, then the glazing viewed in conjunction with the side vertical wall panels, form a harmonious whole and symmetry which could almost be classical in proportions, something that a modern day Palladio would be proud of. There are other symmetries as well, the hedges on either side (later additions), the column radiators just visible inside (these could be early due to the nature of the type of radiator). Taken, all in all, the dark sections, the white sections, the brickwork, they form slabs of patterns that are architecturally neat or sophisticated. Architects spend hours agonising about window sections, the width, their visual arrangement, the joints, how to structurally span, whilst holding the glass in place, how not to obstruct sight lines, to give clarity of sight both in and out and passage of light into the interior. All these have been dealt with deceptive simplicity—and like music, fit together in a form that does not obtrude, yet lets the music sing out, the harmonious design.

wikiarquitectura

photograph 3: Early photograph showing upper row of vent lights, and five equal vertical bands and six broad horizontal bands including step
Mies van der Rohe, 1949-1952

Part of this has been lost in the restoration, because the upper row of lights has gone. The window panes are made larger, more light will be admitted, because of the trimming down of glazing members, but the later modernization has lost a little bit of that Mies magic. Only a bit and probably not many people notice this. It is, musically, as if someone wanted a change that seemed reasonable, to a composition, yet to the composer ruins the whole piece, because all the inner relationships have been shattered. That is how it may seem to the composer, yet to outsiders it may all seem perfectly arranged. In reality, some suggested changes from outside can be beneficial, with an improved result, where the design has gone through various stages and ended up improved, terser, tighter, more coherent, sometimes, not always. Sometimes the composer does not want more coherency, especially with modern compositions, where freedom and subtle points of expression can be hidden in the music for listeners to find as gems embellishing a well-crafted necklace or broach. The same can go for a

modernistic architectural design where all the thought that goes into forming the structure adorned with the enveloping walls, windows, doors and other details hold inner stories of construction. Here it seems likely that Mies would in fact like coherency. The whole ensemble is patent to see, transparent with no hidden agenda (except for the remark above about students and staff being able to understand the building, yet it is composed or designed for the world), a perfect miniature with regular features saying let's not complicate religion, let's make it accessible to all—just look through the window and see: the object of looking is the uncomplicated cross with curtain behind (perhaps a concession to the Jewish 'temple veil', also a plain device providing a demarcation barrier or screen from some sort of vestry area, where necessary accoutrements, like registers, vestments and instruments for the sacraments are kept) and the plain altar.

This is made clearer by having windows only to the front and with few other distracting items, such as simple wooden side benches (normal for servers assisting the celebrant). The altar is 'plain', yet 'monumental' to use Mies's word. Made out of a solid block of marble with simple inscribed crosses on the top four corners, this needs no further dressing of altar cloths. It springs from the floor and is aesthetically something that is not ostentatious yet quietly asserts its presence, waiting, inviting closer inspection. One wonders how it got there, what its provenance was, yet none of this matters, it just *is* there, unmoving, solid, massive, yet beautifully proportioned, part of the central focus of view, supporting and juxtaposing the simplicity of the bright and shining stainless steel cross. The proportions of the cross look perfect. Since Mies also designed chairs (Burton, 2018), which necessitates careful consideration of many design parameters, he would undoubtedly have put thought into designing this most central item of the church. So, what proportions are critical here, how does it relate to the whole? The casual observer through the front window assembly can take all this in at a glance and maybe say to herself or himself, I think I'll just take a look inside. It is patently welcoming. The doors are just there. There is no keep out sign. Rather, the whole building passively waits for you to make just a little move towards it.

These front views are shown in numerous photographs, of which the first *photograph 1* is just one example. In fact, the number of photographs available online, which are probably only an indication—there are likely to be many more in people's collections— are an attestation to the allure and popularity of this building.

There could be another reason for the curtain, a more prosaic reason, or simply a sensible one, which united with the other reasons given could add to their collective design good sense, and that is as united with another deliberate feature: as regards the roof principal beams. Normally, in order to take the loadings and transmit them via the walls to the foundations and then the ground, the beams would be placed at their shortest span, which is transversely, that is from side wall to the opposite side wall. But, Mies has chosen to span the longer way, which means more stress will be put on the beams and they should be bigger to carry the load of whatever is above them, other secondary beams, the roof and weather loadings such as snow. The reason is obvious, that he wanted to place all visual interest upon the cross and altar with the curtain behind. By placing the beams this way around the lines of sight drawn by the beams operate longitudinally as envisaged from the outset in his sketch, *figure 4*. As if by a miracle, the size of these beams seem intuitively (without the luxury of seeing any structural calculations) somehow to be getting away with being small, even undersize.

One of the photographs, as *photograph 4* below, however, shows a small halfbrick wall (a wall 4inches, or 100mm roughly, in width, the approximate width of half a length of a brick) tucked just behind the curtain. This will give some relief to the load being carried. Again, in what appears to be typical Mies design, this wall is pared down to the minimum. Usually such a wall would be one brick wide, the width of a whole brick's length, from the point of view of structural stability. Yet, this wall does not appear to have suffered in any way from buckling or shown any signs of collapse. It is another case of designing down to the bare minimum. There does also appear a transverse main beam above this wall, which goes against what is being said here. There is also another photograph, *photograph 5*, showing another main or principal beam somewhere along the span between the front and this brick support just behind the curtain. So, in a way, what is happening is that what looks like main or principal beams, are in fact secondary beams, and just, to all intents and purposes, to a casual observer, seem like main beams, and or they could, sort of, act as main beams anyway between the supports at either end, the support behind the curtain, and an additional support at mid span.

metalocus

photograph 4: Detail showing junction of main beam, secondary beams and halfbrick wall, also, lighting and underside of concrete pot roof decking, Carr Chapel, Chicago, Mies van der Rohe, 1949-1952

The lighting is surface mounted on the steel beams above and as fittings are appealing, straightforward honest adjustable spotlights with a self-finish blending well with the beams. The cabling is not visible, which is probably just how Mies would have liked it. He seems to have been an early exponent of the honest approach in architecture of showing how things are made, of what they consist (Mies Society, 2016), but as for showing cables, he probably would have liked the neat expedient of hiding them within or on the beam somehow. Incidentally, there does look like a high level window vent system at the back behind the curtain. Whether this is a later addition or not is not clear from drawings and other photographs available. They may have been added for through ventilation and in compliance with some later health and safety regulation, dating from after the initial construction.

metalocus

photograph 5: Detail showing main beam at mid span between front and altar, cross and curtain, Carr Chapel, Chicago, Mies van der Rohe, 1949-1952

It is possible that the introduction of transverse main beams was introduced in the new works of 2008-2013/2014, since the roof was completely renewed. Possibly structural calculations were carried out necessitating a new configuration. If this is the case the looks of the beams as passing from the front to the altar position have been maintained, so what looks like main or principal beams are in the new format secondary beams. The original concept design drawings show the main beams as spanning from front to back (the I sections shown) as *figure 4* and the looks of the beams as passing from front to back are shown in *photograph 4* and *5*. This is especially noticeable in *photograph 5*, the view that would be first encountered from the front window position. The original sketch as *figure 3*, shows some indication of piers or some sort of intermediate support, however, it is likely that Mies wanted clear uninterrupted spans of walling. This would go along with his wish for a clear and simple uncluttered design, inviting accessibility and, importantly, allowing as much

light as possible to flood the whole interior (Jentes, 2010). So it must have been a fairly early decision of his to not have piers or any intermediate supports.

metalocus

photograph 5: Internal view of roof showing beams passing from front to back, looking like principal beams, in fact secondary. Note the alignment with the window vertical members, the mullions, a typical Mies touch, Carr Chapel, Chicago, Mies van der Rohe, 1949-1952

Having examined Mies's design philosophy, the history and vagueries of the Carr Chapel, one further point is worth making, and that is as regards nature. Mies wanted to bring nature into the equation of architecture, for people to see from inside buildings and enjoy all around them (Burton, 2018; Mies Society, 2016). Again, referring to the many photographs on the Carr Chapel available online, invariably they include a tree or more than one in the shot. There is one tree in front of the building which almost adds a picaresque view of the building. The hedges at either side of the front added some time after when the building was first built attest to how people respond to the building this way. The grass around is a designed feature of Mies's, since it was he who first set out the offset grid pattern making sure to have

open spaces in between buildings, as in his 1939 master plan for the layout of IIT (Mies Society, 2016). In many ways Mies was an innovator, whilst also designing with a formula as outlined in the foregoing, yet with a spark that always kept his designs alive, vibrant and appealing to so many people. The secret that is Carr Chapel is an unfolding enigma, that defies any building defects, any exorbitant costs to rectify, leaving such matters irrelevant. It is a fairyland story of enchantment and wonder.

wikiarquitectura

photograph 6: Picaresque view of Carr Chapel with tree,
Carr Chapel, Chicago, Mies van der Rohe, 1949-1952

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Banaei, M., Hatami, J., Yazdanfar, A. and Gramman, K. (2017). ‘Walking through Architectural Spaces: The Impact of Interior Forms on Human Brain Dynamics. *Front. Hum. Nerosci*, 11:477.

Arising from a discussion on Researchgate (today’s date 20.12.2018) about the difference between form and shape this paper avers to use 1104 cluster types from an analysis of AutoCAD interior designs of different internal formations of living rooms, 343 different ‘images’, by various AutoCAD functions, such as line, surface, point, vertex, scale, volume and so on (Maryam Banaei, 19.12.2018). They claim significant results from using mobile brain/body imaging (MoBI) and VR (Virtual Reality) with reactions in the Anterior Cingulate Cortex (ACC) that correlated with certain feature types and geometries ‘providing evidence for a role of this structure in processing architectural features beyond their emotional impact.’. Referring to the online discussion and explaining this further, this means that humans do react to internal arrangements emotionally, and a significant correlative point is that just concentrating upon satisfying internal environments, including sustainability criteria (despite however necessary this is: my statement, yet assumed that it would be agreed by the researchers), misses out these emotional metrics. This endorses a personal view that of virtually the same point, that architects, and other designers, by concentrating upon satisfying certain sets of data, such as to do with the building regulations, human comfort to do with temperature and humidity, cost, possibly set design types of layout and so on, miss out other factors such as to do with the spirit, and this would include emotions. Whilst I feel sure that their research was accurate and thorough, a number of points still need to be borne in mind. The definition of the difference between form and shape in the discussion was given as a prevalent point made by several contributors, that it was solely to do with 3D (form) and 2D (shape). Whilst I agreed with this, I stated that it could also be from an architectural and engineering perspective to do with underlying structure types, such as tunnel form, timber, steel and concrete frames. These then set constraints upon designs and shapes could then be L shaped or other shapes and in fact merged with designs such as by Zaha Hadid. Another contributor stated that it could be to do with typology where shape was then a subsequent factor citing KLCC tower as an example (Shireen Jahnkassim, 19.12.2018). Another point is that whereas the research looked at several design layouts, these could still be constrained within a limited design range, that is, possibly missing out ultimate design flair. However, the actual findings if correct (and they seem to be so from the apparent rigour of the research) do endorse the principle that there can be more to design than by use of manuals, catalogues and standardised methodologies, which opens the way for considering other factors, such as the spirit. The same methodology could be used perhaps to measure a wider set of variables than just emotion, such as spiritual reactions, depending upon precise known locations of different reactions in the brain. This could endorse perhaps the ‘olden’ methodology of just such consideration of internal spaces as affecting human spirit. Lastly, yet related to the point about the number of factors taken into account, there could be a case for the medium affecting the design types and hence the results obtained. It is noted elsewhere that I and others have some reservations about the quality of design by relying heavily upon CAD software. That is not to say that all CAD designs are poor, just perhaps of different quality to designs using manual draughtsmanship, including where designs are retained and then adapted—this is a great cost and time saver and virtually necessitates the use of CAD in competitive and repetitive situations. Repetitiveness and standardisation are points that could warrant further philosophical and aesthetic debate. Perhaps it is a case of recognising the modern world, also where much is tied up with CAD, including automated programmes to help design internal environments, calculate carbon contributions, satisfy building regulation insulation ‘U’

values, calculate air tightness, assist and integrate with structural calculations and financial costing and estimating, provide building specifications and much integrated with BIM, which has its own inherent benefits and disbenefits. One disbenefits being the difficulty of take-up in the construction industry. A benefit being of 'clash detection' where problems and costly hold-ups on site can be obviated by seeing where pipes, for instance, clash with beams. That is just a sample of points about BIM. Lastly, to be tagged into the discussion about use of computers, CAD and BIM is the use of VR. Without entering into a protracted discussion on this, it is believed that generally sufficient use of VR and spin-offs of this such as AR (Augmented Reality) and MR (Mixed Reality, where humans interact with VR, such as standing in a room and questioning the 3D layout for feasibility) and training astronauts to operate on Mars, that this is a viable means of assessing human reactions that sufficiently simulate real-time reactions in real space-time.

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[i] Ana Lopes (27 September 2018) in *CERN Accelerating science*, described finding two baryon quarks with a possibility of a third meson quark. This is on top of Stefania Pandolfi’s similar earlier report in the same magazine (08 July 2016) of finding four quark particles seemingly in connection with tetraquarks, where three particles are of different and higher masses than a fourth. Then this is yet on top of an early similarly reported finding of two pentaquarks in the magazine (14 July 2015). These, then, would be amongst the smallest known components of atoms, hence matter, as measured and verified to date.

[ii] It is noted, however, that Peter Adjaye as cited in this research falls, perhaps, within a popular idiom. His reaction to architecture seems to be translated in a techno idiom.