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Analysis of *Summa* by Arvo Pärt

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PTRDAV003

A dissertation submitted in partial fulfillment of the requirements for the award of the degree of Master of Music (Composition and Dissertation)

Faculty of the Humanities

University of Cape Town

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COMPULSORY DECLARATION

This work has not been previously submitted in whole, or in part, for the award of any degree. It is my own work. Each significant contribution to, and quotation in this dissertation from the work, or works, of other people has been attributed, and has been cited and referenced.

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ABSTRACT

Analysis of *Summa* by Arvo Pärt

David Patrick

This study presents a musical analysis using a process of pitch mapping. Pitch rows are presented graphically to demonstrate the visual design of the music. Description of the process is preceded by a discussion of some of the historical, and philosophical factors that are relevant to the development of Pärt's tintinnabuli music.

The musical and political history of Estonia and some of its other composers are presented as an important resource for understanding Pärt's music. The use of proportions and formulas in the music is presented as being connected to a long line of similar practice in the fields of music, mathematics, physics and astronomy that has been used in the pursuit of an understanding of the Universe. Although informed by an extensive depth of spirituality, research and construction, the music remains an intensely personal expression of the composer. In this combination of structure and intuition it is able to resonate with people across many different cultures, and across many visible and invisible boundaries.

Through the establishment of tonal stability in tintinnabuli music, extra-musical codes and symbols can be placed within its structure. This is achieved through a compositional process that includes both highly organized proportional formulas and creative intuition. The process of pitch mapping as a method of musical analysis demonstrates how this can be done. Pitch mapping is presented as a creative process of musical analysis. Visual images and animated visual images are used to add to an understanding of the music.

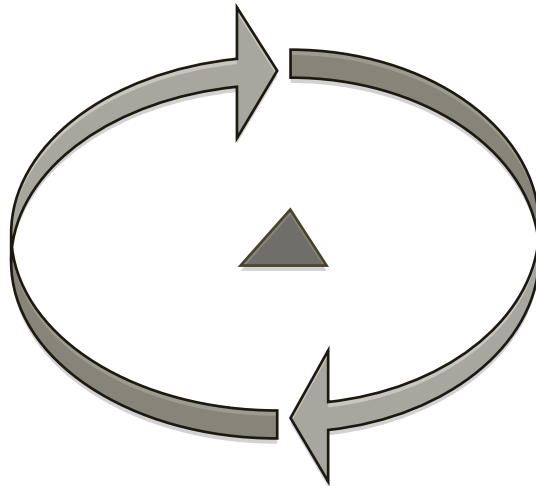
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"In the evenings when they broadcast symphony orchestras, I couldn't torture the others at home with the radio. So I took my bike and kept riding around the telephone pole on the deserted market square for an hour or two. The pole carried a loudspeaker that transmitted the concerts. I took my bike because I thought leaning against the pole for hours might have looked strange. (Laughing) Cycling might have looked even stranger. This is how it happened anyway. The music (was) broadcast by the Tallinn radio or the Finnish radio. I listened to it every day... (Pausing) ... I'm sure it sounds a bit weird. But I don't think it was as awful as it seems. There must have been something else involved, but I cannot explain it... even now. I would say it was a secret wish of mine. I wanted to become a composer. But none of the kind I heard on the radio all the time."

Arvo Pärt: Transcribed from the film 24 Preludes for a Fugue by Dorian Supin

Preface

If you play a sound for a very long time, it grows. It becomes so big that you start to hear many more harmonies, and it becomes bigger inside. The sound envelops you. ... The sound fills the room you are in, it surrounds you, you can swim in it. ... It's all in this sound, the entire universe is in this one sound that fills the room. All possible sounds are contained in this sound from the start. (Giacinto Scelsi, quoted in the liner notes for the album *Natura renovatur*)

In 1987, while reading for a degree in Biblical and Christian Studies, I first came across the concept of Hermeneutics. This big, new word became understandable with the phrase “ways of seeing” , or looking at the world through a given pair of spectacles. The old cliché of looking at the world through “rose-tinted spectacles” would be the obvious example of a hermeneutical perspective. With this understanding, one could say – “Okay so now that I know I’m wearing rose-tinted specs, let me take them off and see what the world *really* looks like?!” Of course, taking off one pair of spectacles usually means putting on another. So is it ever possible to get to the *real* truth? Perhaps not, and perhaps we are never really meant to, but with an awareness of hermeneutics one can get closer to an understanding of our own truth through looking at it from different angles.

Around this time I came across a recording of John Tavener’s “The Protecting Veil”, performed by the cellist, Stephen Isserlis. It was the album cover that first caught my attention – swirls of red and orange against a dark background – a fluttering veil, or stylized flames? Colour, light, simplicity, depth and mystery were all there – captured in a visual image. Listening to the music for the first time, the promise of the visual image came alive in the sounds. In the mystery of this music was a new way of experiencing an ancient truth, of hearing sounds of spirituality presented in a new light, but which told an ancient and familiar story.

The whole universe can be seen as an ongoing cycle of creation and destruction, expansion and contraction. History repeats itself like the simple act of breathing. The universe “breathes” in the elliptical orbit of the planets around the sun, in the

movement of the tides, in the cycle of the seasons, in the breath that animates all living beings. The universe can be seen to vibrate, like a string fixed between two points visibly moving backwards and forwards in a set pattern. Recent developments in physics suggest that the smallest identifiable form of matter is a string, and that all matter is based on the vibration of these strings.¹ Everything in the universe, from the smallest measureable unit of matter to the overall macrostructure of the universe itself can be traced back to a single vibration. In the world of invisible breath and visible vibrations, creation can be seen as the mirror image of destruction. The polar opposites of duality, of good and evil, of creation and destruction become integrated entities. As we breathe in fuel, we breathe out waste. The result is life, energy, spirit. On some very very basic and fundamental level music embodies this. Music, an organization of vibrations, reflects the universe, an organization of vibrations.

From the discovery of Tavener's music, it was a short step to the music of Arvo Pärt and Henryk Górecki.² In the late 1980's the emerging recordings of music by these composers were placed in one category and labeled under the misleading title of "Holy Minimalists". The idea of spiritual, meditative, simple, pure, mystical music composed by modern composers portrayed as being somewhat prophetic and quirkily profound, would prove to work well for a world which had had its fill of remixed Gregorian chants and the "ecstasies" of Hildegard von Bingen.³ Carefully designed CD covers promised music (and in many cases delivered) that looked to the past to become the music of the future.

From the hermeneutical perspective, the "spectacles" used by producers, the media and the first Western audiences to "see" Pärt's music allowed the "viewers" to welcome the music with open arms. But what of the music itself? What happens if the music is viewed from different angles with different spectacles? Does it still stand out as extraordinary music, as music which indeed reflects the universe, or is it merely a

¹ This is discussed further in Section 2.2 on page 22. See also Isacoff, 2002, 189.

² In 1993 Pärt was described as "a composer whose moment has come". David Clarke links his music with that of Taverner and Gorecki under the label of Holy Minimalism. The moment that this music addresses relates to a need amongst consumers of contemporary "classical" music. The music is said to "re-open communications channels, offering tonal purity and simplicity of design. What's more, its religious aura clearly has a strong allure for a secularized culture..." (Clarke, D. "Parting Glances", *The Musical Times*, December 1993, 680)

³ Cf CD *Canticles of Ecstasy*

media-hype that has chanted its way gently and cleverly into the ears of people hungry for some meaning to life and existence?

One of the earliest recordings of Pärt's music to make a lasting impression on me was his *Magnificat*. This prompted an analysis of the work in 1996. From this analysis, it became clear to me that there is a great deal more to the music than meets the ear. This has been confirmed in the process of analysing *Summa*. Analysis reveals a rich world of symbols and science and history and spirituality incorporated skillfully into the music. When listening to the music it is easy to identify the labels of "tonal purity... simplicity of design... a religious aura". What one cannot hear are the compositional devices used on a structural level. When analysing the score the structures can be seen and discovered. The score becomes like an architectural structure within which the music can sound.

Although *Summa* is composed around the words of the Christian Creed, it is not necessarily intended for performance in a Christian church. The music is written in a world where structures of organised religion are crumbling into secular society, either through external or self-imposed destruction. It is a world where spirituality, as opposed to religion, ultimately remains untainted by human obsession with social power – a spirituality that can exist within its own structures, and is becoming more and more liberated by the concept of the divine within. In this context, music becomes its own cathedral, its own resonating chamber within which it can be experienced.

This analysis of *Summa* focuses on how the rows of pitches are constructed from a single generating nucleus, using principles of design and symbolism that are directly informed by the spirituality of the work. The work is approached as an art form rich in visual imagery; visual imagery that is also cinematic, a score that becomes its own place of acknowledgment and reflection, and a score that is also a soundtrack for its own movie. Like icons, visual symbols in the score become windows through which the invisible can be seen. Words in the text of the *Credo* become vehicles for expressing not the literal meaning of the words themselves, but rather ideas and feelings that cannot be expressed in words.

Jean-Jacques Nattiez suggests that analysis can show how a work of art functions. Analysis can take into account the work's genesis, its organisation and how it is perceived (Nattiez 1990, ix). To this he further adds elements of semiotics. This analysis of *Summa* is an attempt to understand how it functions. It focuses particularly on the 'organisation' of pitches in the work, how the rows of pitches are constructed and some of the symbolism apparent in this construction. Through seeing the structure in the music, it becomes possible to see beyond the structure, and to begin to understand at least a small part of the mysterious and beautiful space created in the music, a resonating dimension, a cloud of unknowing shrouded by a protecting veil, in which ancient and familiar stories can be experienced without words.

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Introduction

By now, there have been several attempts to label the Tintinnabuli style such as “new simplicity”, “minimal music”, etc. Tintinnabuli is a new phenomenon, which is difficult to analyse and classify by way of existing musicological standards. With his compositions, Pärt has brought about a paradigm-shift in modern music, and the attempt to analyse this shift has in turn given rise to its own process of creative discovery. (International Arvo Pärt Centre website: <http://www.arvopart.ee/>)

Commenting on the current state of musical analysis, Kofi Agawu refers to the writings of Lawrence Kramer, rephrasing them as follows:

We should now accept that there are no nuggets of identity, no positivisms, no irreducible essences. There are no invariant first principles, no God or universal reason, no single grand narratives by which human history can be conceptualised. Our epistemologies are constructed and situated. Everything is fragmented and discontinuous; all truths are partial and provisional. Nothing is ever objective, nothing is ever "new," and nothing can be taken for granted. (1997, 301)

Agawu claims that this "bold attempt to wipe the slate clean is, of course, salutary, a long overdue and a much-needed initiative to liberate musicology (and music theory) from their ostensible conservatism and complacency" (1997, 301). As the slate is wiped clean, it leaves an open space without defining or limiting structure. On this clean slate the analysts can apply their own structure, much like the composer, taking the best from all worlds, adapting old structures and developing new ways of seeing. It seems the concept of *tabula rasa*, the clean slate, was an important concept both in music analysis and in musical praxis in the late 20th century.

One of Pärt's defining works is entitled *Tabula Rasa*, (composed in the same year as *Summa*, 1977), which Hillier describes as one of the pre-eminent examples of Pärt's new

music (with *Fratres* and *Cantus*). It has become one of the most frequently performed of his works (Hillier 1997, 101). For Pärt, cleaning the slate was a conscious process:

In my case, if we want to reach to the core of a musical work, no matter what kind, we cannot forgo the process of reduction. In other words we have to throw out our ballast – eras, styles, forms, orchestration, harmony, polyphony – and so to reach to one voice, to its ‘intonations’. Only there are we eye to eye [with the question]: ‘Is it truth or falsehood?’ (Hillier 1997, 65)

It is almost as if Pärt’s journey as a composer is echoing a similar search being undertaken by music theorists. If we were to take a leaf from Pärt’s book, then the way forward for analysis could also be a “process of reduction”, and of “throwing out our ballast.” From here, new contemporary forms of analysis could arise from the analytical world’s equivalent of a *tabula rasa*.

The point of analysis must surely be to enter into a “process of creative discovery”⁴, to discover, and marvel at, and learn from the very soul of a piece of music, and in this process to discover, and marvel at, and learn about the design and the soul of the universe. In this way, analysis becomes a creation in its own right. Musical analysis is a verbal and visual record and evaluation of a non-verbal and invisible phenomenon. Within the phenomenon of music there is the interaction of invisible vibrations. There are so many different variables, levels and components to this interaction of vibrations that it would be impossible to entirely demystify it. Music is infinite. Analysis can reduce elements of the infinite to be represented in a finite framework, which is “partial and provisional”. It is through this defined framework that a window can be found through which we can “see” the invisible infinite. On a deep and profound level there is a property within music of recognition and identification. In music, through recognition and identification with patterns of vibrations, one can experience a feeling of belonging central to human existence and experience, of not being alone, of being at one with the universe. The question for the analyst then is: How can this property of the music be exposed through an analytical process?

⁴ See quote from the International Arvo Pärt Centre website on previous page.

On entering into a study of the music of Veljo Tormis, Urve Lippus refers to the importance of choosing a suitable method of analysis, and of understanding what aspects of the music are revealed by what strategy (Lippus 1996, 483). A semiotic approach to analysis might reveal more about the symbolic content of the music, and a structural approach might reveal more about the structure. Lippus speaks about a “symbiotic analysis” using both semiotic and structural techniques, which could reveal on the one hand the constituents of composition and their relationships; and on the other the internal, external and extra-musical meanings and associations operational in the music.

Recent analyses of Pärt’s music have approached it from many different perspectives. For example, one can look at some of the topics presented at recent conferences held in Boston and London and Tallinn in 2010:⁵

“The complex austere simplicity of the *Tintinnabuli* style by Arvo Pärt”, Saale Kareda

“Time and timelessness in Pärt’s *Tintinnabuli* Style”, Leo Brauneiss

“*Tintinnabuli* solutions to the problem of closure in minimalist music”, Andrew Kohn

“Violent Ecologies: Arvo Pärt and Documentary Film”, Laura Dolp

“Music and suffering: *Spiegel im Spiegel* as humanizing agent in *Wit* (2001)”, Benjamin Skipp

“Pärt’s Soundtrack of an Age: Diagnosis, Post-Mortem and Obituary of Modernity”, Robert Sholl

“Russian Bells: A Liturgical Inspiration for *Tintinnabuli*”, Marguerite Bostonia

“Arvo Pärt: Minimalism, Icons and Interiority”, Robert Sholl

“Aural Icons: Multiple Ontologies and the Work of Recognition in Arvo Pärt’s *Tintinnabuli* Music”, Jeffers Engelhardt

Arvo Pärt’s music has been looked at from many different angles; different spectacles and different views, each providing valuable creative insight into his music. Most of these commentaries on Pärt’s music include aspects of:

⁵ A full list of titles and abstracts of papers presented at these conferences can be seen at their respective websites: <http://www.bu.edu/apcsc/papersabstracts/>, <http://www.southbankcentre.co.uk/sites/default/files/Arvo-Part-Soundtrack-of-an-Age-schedule.pdf>, <http://www.ema.edu.ee/ktkdk/?s=170>

1. Semiotics, looking at the relation of the music to symbols and icons, and presenting ideas concerning the symbolic 'grammar' and 'text' used in the music
2. Hermeneutics, looking at the socio-cultural context of the music and its reception
3. Structure, looking at the structural mechanisms operating in tintinnabuli music

This analysis of *Summa* examines another area that is often alluded to in writings about Pärt's music. Hillier describes how while studying at the Conservatory with Eller, "Pärt found work as a recording engineer with Estonian Radio. He also composed music for theatre and film." (Hillier 1997, 29) Hillier also illustrates how Pärt creates visual maps of his works as follows:

For larger compositions especially, Pärt creates a visual map of the work's form which he pins up on the wall of his study. This consists of the text, cut up into separate verses, with pitch indications and other musical data and the use of different colours to depict the voices and orchestration. The result, much more than a mere sketch, encapsulates the entire work at the point where the initial gesture has found its appropriate system. (Hillier 1997, 201)

In his listed compositions, Pärt does not include his music written for theatre and film. However, given that he scored music for around fifty films (Duckworth 1999, 167), it is unlikely that his experience of composing for visual media, and of working in an environment of musical technology had no effect on him. In analysing *Summa*, it is possible to suggest that elements of technology and moving pictures are apparent in the design of his music.

The following statements by Pärt in an interview with Geoff Smith in 1999 further inform the methodology for this analysis:

The geometry is the point where everything starts. Geometry and landscapes are not independent from each other but relate as starting point and process. The geometry is an abstraction not unlike a mathematical formula. (1999, 20)

“All important things in life are simple. Just look, for example, at the partial tones of the overtone scale: the initial, lower overtones are perceptible and easily distinguishable, whereas the upper ones are more clearly defined in theory than audible. (1999, 21)

From these quotes, it is apparent that geometry and simplicity are important to Pärt when composing, as well as the sounds of the overtone series – in particular the lower overtones. There is also a strong reference to visual concepts, which both Pärt and his commentators speak about in his music. Figure 1 provides an example of a ‘melodic drawing’, which pre-dates the birth of the tintinnabuli style. In this drawing it is clear to see Pärt’s experimentation with visual patterns derived from a natural phenomenon and compositional technique.

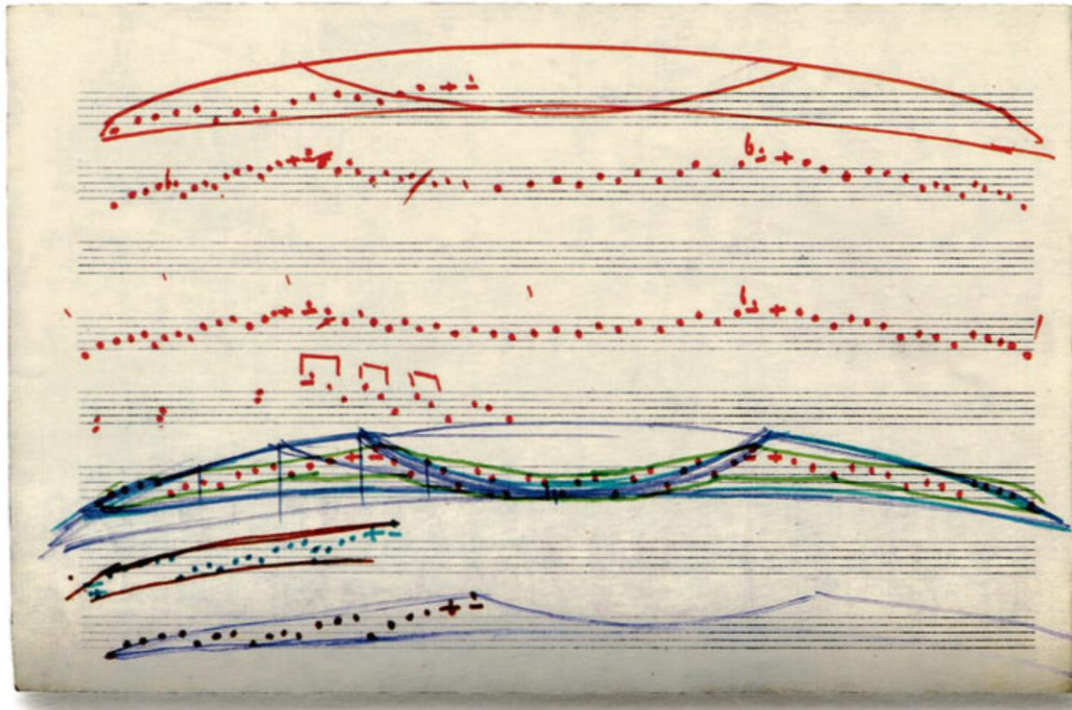


Figure 1: A ‘melodic drawing’ by Arvo Pärt (1976) meant to convey a bird’s wing movements. (Source: International Arvo Pärt Centre /New York Times Magazine October 17, 2010, http://www.nytimes.com/2010/10/17/magazine/17part-t.html?_r=1&pagewanted=all)

In consideration of these aspects of Pärt’s music, the analysis will be approached from a visual perspective. What does the music look like? What does the score look like? Is there geometry and landscape in the music? Using these questions as a starting point, a process of pitch mapping has been developed whereby the pitches used in *Summa* are

presented visually in pitch maps. These maps can also suggest possible processes of composition used, as well as an indication of the importance of numbers and geometry in providing both structure and dimension to the music. Through this interplay between structure and dimension, the music interacts with visible and invisible dimensions and energies.

It is possible to view music with a particular pair of spectacles that sees it as an entity in itself entirely separate from its context. This analysis chooses to see context as important in understanding music and begins with an overview of music in Estonia. This forms a starting point to understanding Pärt's music in relation to the environment from which he emerged as a composer. Rather than subscribing to the "holy minimalist" label, it places his development as a composer within the context of musical culture in Estonia, and demonstrates similar characteristics between his style and techniques of composition and those of other Estonian composers.

The analysis will then discuss Pärt's use of harmony in his earlier tintinnabuli works, with particular reference to *Spiegel im Spiegel* and *Cantus in Memory of Benjamin Britten*. From here, more specific analysis of *Summa* will begin. Developing the idea of a 'visual map', an overview of the structure of the work will be presented, followed by a more detailed focus on the pitches used in the music. This leads to the process of pitch mapping.

These topics will be covered in the following chapters:

1. History
2. Harmony
3. Structure
4. Pitch mapping

1. History

I imagine the conductor having an upbeat when the whole thing starts. We can't hear anything yet. And the people in the concert hall don't know what is coming. Then the conductor makes the upbeat. The upbeat, the moment when he raises his hand actually contains the formula of the entire work. Its character, dynamics, tempo, and plenty of other things. The conductor and the musicians know it from practicing together. I guess the composer is in a similar position before he starts writing. He must have the knowledge or a perception of what's coming when the hand goes down. What is the first note? And what's the second one? The first step is everything, decisive. This is a complicated story I don't quite understand myself. But I have an idea of what I want to say. I'm always looking for it. Sometimes it comes easily, sometimes it doesn't come at all. Every time I feel I have to start from scratch. (Arvo Pärt. Transcribed from the film *24 Preludes for a Fugue* by Dorian Supin)

Arvo Pärt was born in Paide, Estonia on the 11th September 1935. He spent his early life in Estonia, and after spending most of the last two decades of the twentieth century in Germany, has returned to Estonia in his later life. It is in Laulasmaa, Estonia that, with his family, he founded the International Arvo Pärt Centre in 2010. In developing an understanding of his music, it is also useful for the analyst to 'return to Estonia' in order to see the composer within the context that has surrounded him for most of his life.

At the Bridges of Song International Song Festival in Tallinn, July 1991, Estonian choral composer, Gustav Ernesaks, made the following speech:

"It is a privilege to welcome choirs from different countries of the world to Tallinn. Let us build bridges of song over the countries and over the seas. Until now, unfortunately, we have been living apart from one another in an atmosphere of mistrust. It makes me happy to witness the triumph of common sense in the last few years. We have begun to understand that the earth is too small for quarrelling. Why should we not enter the future together? In sports the bitterness of losing is known. The winner is overjoyed and the loser feels

depressed. If choirs meet good choirs and a receptive audience, there are no losers. Let us then build bridges of friendship. It is beyond doubt that the strongest and the most durable of them are bridges of song--they cannot be destroyed. They reach from your hearts to our hearts." (*Bridges of Song Festival Songbook*, v)

At the age of 83 when he made this speech, Ernesaks had lived through the greater part of the 20th century, through periods of Estonian independence, occupation and dictatorship. He had witnessed and been instrumental in the development of a strong and vibrant tradition of choral music in Estonia. For the 1947 Song Festival, Ernesaks penned the music for *Mu isamaa on minu arm* (My Fatherland Thou art my Love) (words by Lydia Koidula). This song became an unofficial and illegal national anthem (Wolverton 1998, 23), and to this day still brings tears to the eyes of those who experience it (<http://www.youtube.com/watch?v=34mYIYkzPVU>).

In the Estonian summer of 1988 it was the time of the Singing Revolution.⁶ A massive demonstration, *Eestimaa Laul* (The Song of Estonia) drew an estimated crowd of 30% of all Estonians. This singing crowd voiced their national identity in a powerful message of protest against Soviet occupation of Estonia through the singing of national and patriotic songs forbidden by the Soviet regime (<http://www.tallinn-life.com/tallinn/estonian-singing-revolution>). Three years later, in 1991, Estonia along with the other Baltic states, Latvia and Lithuania, gained independence from the Soviet Union.

Music has had a very powerful impact on Estonian society. The development of music in Estonia can be linked to rich traditions of both folk and art music. Folk music is represented both by ancient runic songs, and also by rhyming folk songs of more recent origin. Like its Baltic neighbours, singing forms an important part of social life. Most villages have their own choirs. Local festivals of song and dance provide a platform for

⁶ "We sang all night and everybody went home early in the morning. It was emotionally so strong that the next day there were even more people. The day after, there were even more people. People took out their hidden flags. They had these flags hidden for 50 years and now they took these out and started to wave them." Artur Talvik, participant. <http://www.tallinn-life.com/tallinn/estonian-singing-revolution>

regular social and public events, where national folk music is performed and celebrated (Wolverton 1998, 22). In 1632 Tartu University was founded to accommodate the needs of the Baltic German gentry. More than two centuries later, after the abolition of serfdom and a period of “national awakening” (from the 1860’s to the mid-1880’s), the first Estonian Song Festival took place. This was in Tartu, in 1869 (<http://www.emic.ee/>). The tradition continues to this day, and it was at this event where Gustav Ernesaks made his speech in 1991, the year of Estonian independence.

The creation of the Estonia Theatre in Tallinn, and the Vanemuine Theatre in Tartu in 1865 contributed to establishing a national culture of Estonian art music. Both venues provided a platform where Estonian culture could be presented and explored. Professional Estonian musicians and composers started to emerge, and with this a recognisable Estonian national music identity began to develop. Many notable Estonian composers went to nearby St Petersburg to study music. Rudolf Tobias, Artur Kapp, Artur Lemba, Cyrillus Kreek, Mart Saar and Heino Eller all returned to Estonia to become the pioneers of Estonian art music (<http://www.emic.ee/page?id=70&lang=eng>).

1.1 The Pioneers

In 1919 in Tallinn, Artur Kapp established the Higher Music School, and in Tartu, Heino Eller started a school of composition. It was in Tartu particularly that symphonic music and music with a strong sense of national identity began to emerge. Under Heino Eller, the acclaimed Estonian symphonist Eduard Tubin, honed his skills. Here too, Villem Kapp (nephew of Artur Kapp) studied with Heino Eller (<http://www.emic.ee/helilooja/heinoeller?lang=eng>). In 1940 Eller moved to Tallinn and from here continued to play a pivotal role in the development of Estonian composers. Among his pupils here were Veljo Tormis, Jaan Rääts, Arvo Pärt and Lepo Sumera, all of whom have continued to play an important role in the development of Estonian music both through their compositions and through their pupils. By the end of the 20th century Tallinn had become among other things, a vibrant centre for Estonian music and musicians.

Heino Eller graduated from St Petersburg Conservatory (1919 – 1920) where he studied with Glazunov. As a teacher himself, he is described as using “integrated instruction ... modeled largely on Russian principles” (Hillier 1997, 28). The idea of integration, combined with a fine sense of construction, can be seen as a common thread in the diverse musical styles of many Estonian composers. This common thread must certainly be a tribute to the influence of Eller and the other pioneers of Estonian art music.

From the late 19th century and through the first two decades of the 20th century, Estonian composers started developing a uniquely Estonian music. This national music “went through the entire Western music history from classical to modern European trends” and “remained characterized by the presence of all eras in one moment of time” (<http://www.emic.ee/>). Through integration, styles from different eras in music history became fused into contemporary compositions. A full century later, this feature can still be seen in Estonian composers. Pärt’s “collage” works dating to the 1960’s, are a good example of this.

Strong traditions have developed in both vocal and instrumental music. In both areas the influence of folk music has been highly significant in establishing an Estonian identity. The practice of collecting, analysing and systematising folk songs is common to many Estonian composers; from Cyrillus Creek and Mart Saar, in the late 19th century to the more recent work of Veljo Tormis.

The music of Mart Saar (1882 – 1963) integrates archaic folksongs with contemporary sound, using folk song modes (Dorian, Lydian, Myxolydian) (<http://www.emic.ee/helilooja/martsaar?lang=eng>). From unison to eight-part writing, different voices were “piled” in complicated sonorities, even tone clusters. This practice of writing music in which harmonic function is determined by modal scales and polyphonic techniques rather than by conventional Western tonality is a process that can be recognised in many Estonian composers after Saar.

1.2 Individualised technique

Jaan Rääts (1930 -) studied with Mart Saar and Heino Eller. He has written mostly instrumental music that has been described as “anti-Romantic” (<http://www.emic.ee/helilooja/jaanraats?lang=eng>). It is also integrative music in which the important structural components are form, motif and linear polyphony. Within his playful style, different elements could include: rhythmic drive, Mozartian triads, modernist clusters, musical ideas from baroque and folk music and pop music rhythms. In Rääts’ music, the legacy of both Saar and Eller continues.

Rääts is also credited with developing a specific technique in his compositional style, the “snapshot technique”. The practice of individualising a compositional technique is a feature of a number of Estonian composers.

Erki-Sven Tüür (1959 -) studied composition with Jaan Rääts in Tallinn and later privately with Lepo Sumera, after studying percussion and flute in Tallinn and founding and playing in a progressive rock ensemble called *In Spe*⁷ in the late 1970’s⁸ (<http://www.emic.ee/helilooja/erkkisventyyr?lang=eng>). He also furthered his studies in electronic music in Karlsruhe, Germany. His musical interests and influences have included Gregorian chant, minimalism, linear polyphony, micro tonality, dodecaphony and sound-fields. In his career as a composer he has developed two distinct individualised compositional styles. The first, “Metalanguage” refers to the combining and contrasting of musical opposites – tonality with atonality; regular repetitive rhythm with irregular complex rhythms; and tranquil meditative moods with explosive theatrical gestures. His second method, the “Vectorial method” is where the “entire

⁷ Also the title of one of Pärt’s earliest tintinnabuli works *In Spe* (1976), later re-worked as *An den Wassern* (1984) .

⁸ On the Estonian Composers Union website, the following quote is given at the occasion of a reunion concert of *In Spe* in Tallinn and Tartu in December 2009:

“*In Spe* (‘in hope’ in Latin) gave its first concerts in Tallinn, in the hall of TPI (now Tallinn University of Technology) in December of 1979. It was a reformation... We were forced to start from tabula rasa by the endless confirmation of the programs and the suspecting paranoia from KGB. Anyhow, the time of *In Spe* was the best creative laboratory for me as a beginning composer. But this especially warm feeling of being sympathizers and taking care of each other as friends; also the indescribable atmosphere both in rehearsals and concerts was even more important. Strangely, as if we had fallen into a time capsule, we experienced it again at the Tartu Music Days this spring. So we decided to come together one more time in the winter and share the joy of playing music together with all of you who were not in Tartu in the springtime... or those of you who wish to come along to our joint journey once again.” (Erkki-Sven Tüür)

composition is encapsulated in a source code – a gene, which, as it mutates and grows, connects the dots in the fabric of the whole work” (<http://www.emic.ee/helilooja/erkkisventyyr?lang=eng>). Vectors are defined by intervals, which are indicated by a sequence of numbers. The whole system can be flexible, but the central organisational principle is important. This concept of composition can be compared to Pärt’s technique whereby a composition is based on “a single gesture”, and both can be related to the concepts of “fractal” composition and algorithmic composition.

1.3 Codes and context

Written music can be seen as an intricate network of coded messages. Conscious development of this network in the compositional process could be seen as being as important a work of art as the sounds that the written notes give rise to. A whole world of sound, imagery and coded messages exists within music, a secret language which, whether the listener is aware of it or not, enriches and informs the sound which is experienced.

From the late 1950’s Veljo Tormis gained critical acclaim as a composer, and has been a highly significant contributor to the process of affirming Estonian national identity (<http://www.emic.ee/helilooja/veljotormis?lang=eng>). His influence has extended from music into areas of education, politics and socio-cultural expression. Starting with a neo-classical approach to composition he integrated this with an extensive study of folk music. Tormis states that he had his first connections with Estonian folk music indirectly, through Mart Saar and Cyrillus Creek. While a student, he was encouraged to conduct his own ethnomusicological research into the source material, resulting in extensive field trips to record folk music (Anderson 2000, 24). Apart from his exposure to folk music, he also experienced directly and indirectly the influences of both Artur Kapp and Heino Eller. He studied composition with Eller and with Villem Kapp (nephew and student of Artur Kapp, and also a student of Eller). Through Tormis’ teaching, this line has continued through to Lepo Sumera (1950 - 2000), who in turn, was a teacher of Galina Grigorjeva (1962 -). In his role as a teacher at Tallinn Music High School (1956 – 1960), Tormis also taught the young Arvo Pärt.

It is interesting to note here that a similar harmonic sound can be heard at least in Tormis' and Pärt's music and also in that of Tormis' other pupils, Sumera and Grigorjeva⁹. This sound relates to the *gestalt* principle where "the whole is more than the sum of its parts". Martin Anderson describes it as follows:

One obvious characteristic of Tormis's (sic!) music, apart from the rhythmic punch of its relentless ostinati, is its harmonic astringency. As a result, it looks deceptively bald on the page: the sense of growing excitement that immediately hits the ear isn't always obvious to the score-reading eye. (Anderson 2000, 26)

To which Tormis responds:

I often build works over a pedal point. Our solo songs don't lend themselves to harmonization, as it used to be done in Romantic music. Our classical composers also use these melodies – very short, in three, four stages. You can't harmonize them, so I was looking for other possibilities: parallel, chords, clusters... (Anderson 2000, 26)

It is this search for "other possibilities" which becomes a significant component of Tormis's music, as well as in the music of many Estonian composers. Up until the end of the twentieth century, the area within which Estonian composers could safely search for "other possibilities" was quite clearly demarcated by Soviet boundaries, boundaries that were geographical, ideological, spiritual, social, cultural and oppressive. Within these boundaries a musical language that contained aspirations of identity, liberation and freedom would need to be coded into signs and symbols. For Estonia under Soviet rule, "...song was a vital expression of national identity." (Anderson 2000, 26) Within this context folk music has particular significance. Messages of national identity can be expressed and experienced through signs and symbols that can only be seen if one is wearing the correct spectacles.

⁹ Pärt's use of harmony will be discussed in the following chapter. Examples of Sumera's work where this is evident particularly include his choral works like *The Mushroom Cantata* and *How long will your homeland be in dark?* Grigorjeva's choral work *On Leaving* also applies here, as well as *Prayer* for saxophone and organ.

Regarding the political content and context of Tormis' music, Mimi Daitz makes the following point:

... if one regards Tormis's (sic!) use of Finno-Ugrian folk material as a statement against the ongoing Russification of the non-Russian Soviet Republics, then about 90 percent of his choral music, much of his vocal solo and ensemble music, most of his children's music, and many of his sound tracks for films may be characterized as politically motivated, created with the intent of supporting Estonia's cultural heritage, criticizing Soviet rule over his country, and, on occasion, reproaching his own people for their foibles. (Daitz 1995, 110)

This indicates how Tormis' use of folk music goes way beyond a purely ethnomusicological or formal exercise. It also can be seen to operate as a vehicle for socio-political comment and transformation. In this context, music acts as a means of communication of extra-musical ideas. As in any language system, a network of signs and symbols is operational within music that requires certain skills in order to interpret them.

Anderson illustrates how "the ability to communicate through art is a constant in discussions with musicians who lived through the Soviet oppression" (Anderson 2000, 26). He refers particularly to the Czech composer, Petr Eben. Eben uses the understanding that people became accustomed to "reading between the lines" with music. Unlike visual art and literature, music is "abstract and it was not so easy to survey". In this way composing music was a means for conveying subtle messages where communication was otherwise restricted. Anderson describes Tormis' response to this concept as follows:

Tormis laughs at the bittersweet memories this account invokes. "We had a joke here that you must sing in Latin. Some songs you had to sing in Latin, in order that our Communists would not understand: they knew only Russian. Some songs were translated into Latin to protect the songs, though their original language was Estonian." (Anderson 2000, 26)

Listeners recognise, consciously or sub-consciously, messages placed within music. While the comments of Eben and Tormis indicate how this is true for culture and language, the concept of recognition of messages within music can also extend into other more subtle and deeper levels. Essentially this can be seen as an example of hermeneutics in action on a grand scale. With the correct spectacles one can recognise coded messages. Another example of this can be seen in Thomas Brachert's discussion of Leonardo Da Vinci's *The Last Supper*, which is referred to in more detail on page 53 of this dissertation. In this recognition lies a sense of belonging, and through this the empowerment to believe in an affirmation of identity and the potential for liberation. Estonian musical praxis provides an example of how socio-political liberation can be realized through the power of musical experience.

In Estonia, secret messages of national identity could be recognised by the Estonians whose freedom was being compromised. Through using the language, the boundaries could be eradicated first on an ideological level and then through the national assertion of identity to remove externally imposed boundaries, as seen in the achievements of the Singing Revolution. If this is true of Estonian music, then it could be that there exists in the model of Estonian music praxis a powerful model of liberation.

This is an area of particular interest when analysing the music of Arvo Pärt. It is also possible that response to music occurs on deeper and more physical levels, which are not necessarily perceived on a conscious or cognitive level. What if the coded messages in music are blueprints for spiritual concepts – energy that can be felt, but not be expressed in words, divine proportions that can be recognised on subtle levels? Through this profound recognition, the listener could then experience a sense of belonging to the order of the universe, and through this the empowerment to believe in an affirmation of oneness with all things and the potential for spiritual liberation.

Perhaps there is an essence of liberation, distilled from a national experience into an intensely personal expression, which strikes chords of resonance in listeners throughout the world. Globally, many of these listeners will have no knowledge of the socio-political environment within which the music was created. However, the deep yearning for liberation experienced on a very physical level, expressed through a

musical language encoded with universal symbols becomes a point of identification for all people yearning for or experiencing liberation, be that physical, emotional or spiritual.

1.4 Spirituality

Born in Ukraine, Galina Grigorjeva (1962 -) moved to Tallinn, where she studied with Lepo Sumera as a postgraduate student before becoming a freelance composer (<http://www.emic.ee/helilooja/galinagrigrorjeva?lang=eng>). Like Pärt, she derives inspiration from Eastern Orthodox Spirituality. Speaking about her piece *On Leaving*, she says the following:

For this composition I turned to the prayer book and selected certain lines... While working on the composition I acquainted myself with the 15th-17th century tradition of polyphonic singing and with various forms of Russian sacred poetry. The natural dissonance and the almost impenetrable rhythmic organisation of heterophonic polyphony I find most remarkable. It's these very elements, to my mind, that give the national musical culture its distinctness.

(http://www.mymusicbase.ru/PPB/ppb23/Bio_2391.htm)

While polyphony and idiosyncratic use of harmony and rhythm remain as core features of their music, the musical model shifted at least for Pärt and Grigorjeva from ancient folk music to ancient sacred music. As Grigorjeva says, these elements give “the national musical culture its distinctness.” This “distinctness” could be directly related to the influence of the techniques of polyphony, whether it is derived from its practice in ancient sacred music or folk music.

Another Estonian composer with a significant spiritual dimension to his music is the composer Peter Vähi (1955 -). He is described as having a broad-minded stylistic versatility and listener-friendly sound. Characteristics of his style include meditative-philosophical moods, motoric movement, combinations of archaic and contemporary sounds (in both style and instrumentation) and elements of pop music (<http://www.emic.ee/helilooja/peetervahi?lang=eng>). He has been actively involved in

Buddhist practice in Estonia and has studied traditional Oriental music extensively. Vähi's association with Buddhism and Eastern thinking also points to another significant aspect of many Estonian composers, that is a strong identification with spirituality. This spirituality informs the compositional process of what remains essentially as art music, rather than music intended for religious practice. Through not confining their music to religious dogma and praxis, Estonian composers express a broader spirituality that refers to specific religious practice, but is not trapped within that practice.

1.5 Codes, Spirituality and Individualized Technique

Urmas Sisask (1960 -) is another contemporary Estonian composer who has developed and named his own musical language and compositional style (<http://www.emic.ee/helilooja/urmassisask?lang=eng>). He is the brother of Estonian pop singer Sirii Sisask, and a pupil of Rene Eespere and Anatoli Garsnek (1918 -1998). Through these two composers, the compositional lineage can be traced back once more to Heino Eller. Common again to Garsnek and Eespere is the importance of folk music in the definition of their style, and a musical language that again incorporates spiritual, ethical and patriotic themes. In the music of Urmas Sisask, this is added to with his unique musical language, which he has called "astro-music". In this music, Sisask claims that his "mission is to learn the harmony of the musical instrument of the Universe and to make it audible to the people" (<http://www.emic.ee/helilooja/urmassisask?lang=eng>). After completing his studies with Rene Eespere in 1985, Urmas Sisask left Tallinn and moved to the small town of Jäneda in northern Estonia. From here he writes music and delivers concert-lectures on astro-music.

Astro-music incorporates two methods: the Intuitive method and the Mathematical method. The Intuitive method is based on experience, observation and astronomical knowledge. The Mathematical method uses theoretical pitches derived from numerical descriptions of the movements of cosmic objects. Rotations of celestial bodies are treated as oscillations that can be converted octave by octave to the range of human hearing. Using this method, Sisask developed a five-pitch series based on the Solar System of planets: C#, D, F#, G#, A. This scale corresponds exactly to the pentatonic

Kumayoshi scale of Japanese traditional music. This scale also relates to the Lydian mode on D.

Other influences in Sisask’s music include Estonian shamanistic culture and Rune-songs, and elements of sacred music (Gregorian chant, Lutheran choral harmony and Russian Orthodox texts). Polyphony is an important element within his music. Incorporating simple ostinato, ecstatic rhythmic pulses and variations of vivid kernel melodies, Sisask’s music expresses religious and mythological ideas. It is seen as embodying an archaic vision of the human being as a particle of nature, and the whole universe.

1.6 A common thread

In the same way that there exists a tradition of Estonian lace knitting, Estonian composers and their music have a common thread in them, a thread which can also be seen in the music of Arvo Pärt. Some of the elements that make up this thread are featured below (see Figures 1.1 and 1.2).

	Common elements in compositional styles of Estonian composers
1	The use of ancient music – secular , sacred or both
2	Accomplished attention to structural detail – form, timbres, sounds
3	Integration of different/opposing elements within the music
4	Anti-Romanticism and/or assertion of self/national identity
5	Named, individualised compositional technique
6	Spiritual or humanist elements not bound by religious dogma
7	Coded symbols/language within the music
8	Importance of words: <i>In Spe, Trivium, Tabula Rasa</i>
9	Instrumental and/or vocal works

Fig 1.1 Common elements in compositional styles of Estonian composers

	Common Direct or Indirect Links of Estonian Composers
1	Moscow or St Petersburg Conservatoire
2	Heino Eller and/or Artur Kapp
3	Estonian Composers Union
4	Spiritual/religious practice
5	Estonian Radio
6	Teaching Composition
7	Tallinn or Tartu as a musical base

Fig 1.2 Some Common Links of Estonian Composers

2. Harmony

...ALL that exists, if IT exists at all, does so in a state of vibration. And if IT is not vibrating, IT does not exist, and certainly, is not perceived to exist. If IT is perceived to exist, then it must exist in a state of "frequency". And physical frequency is "pitch" – musical pitch... From quarks, to atoms, to molecules, to cells, to bodily organs, to [whole] bodies (note frequencies/pitches of bodily functioning), we hear music. From the spin of the Earth and its musical pitch, to the configuration of the planets of the Milky Way, to the spiral galaxies of outer space, we hear music. From the colors in the electromagnetic spectrum, to the ratio forms of flowers and trees, we hear music. BEAUTY! (Eagle 2001, 1, 4)

A strong influence on the vibrations and harmonic structure of Arvo Pärt's music is that of polyphony (Hillier 1997, 78). This is not unusual in Estonian art music. However, whereas other Estonian composers explored polyphony through folk music, Pärt worked with polyphony largely through his own interest in early sacred music. This included the music of the Notre Dame School, Machaut, Franco-Flemish music, Obrecht, Ockeghem, Josquin and Victoria. It would appear that his interest in this music was to reach beyond just the mechanics of polyphony learnt while he was studying music at the conservatory. It was the 'spirit' of the music that most interested him (McCarthy 1989, 132). His understanding of this 'spirit', combined with a thorough understanding

of the mechanics of the music is what he has come to express in his own music, in tintinnabuli¹⁰ music, in a manner that is relevant to its expression today.

2.1 Harmony and structure

Pärt has said that "tintinnabuli was my attempt to tackle the problem of polyphony" (Smith 1995, 22). In Dorian Supin's film *24 Preludes for a Fugue*, Pärt addresses a group of students about the process of composition using *Für Alina* (later in the film credited as marking the birth of tintinnabuli music) to illustrate. He speaks of the combination of two voices for the composition:

Let us have a look at *Alina*... I'll show the beginning. (I don't like this timbre, I'll make it more sounding.) ...

Listen to this voice... (plays higher melodic voice in the right hand)

Quite neutral...

(Then plays lower voice, the notes of the B-minor triad in the left hand)

Also neutral...

Both together...

(Plays both together)

A bit more serious or complicated. Like two people... (hands gesture...) whose paths seem to cross and then they don't.

(Plays on...)

There is some neutrality here. I'd say that I had a need to...

I wouldn't call it neutrality. A need to concentrate on each sound, so that every blade of grass would be as important as a flower.

(Starts *Alina* again, this time sounding the fundamental bass)

This is actually...

¹⁰ The International Arvo Pärt Centre website describes Pärt's *tintinnabuli* style as having a basic structure where "two parts join to form an inseparable whole. One of the two is the omnipresent major/minor triad, the notes of which are bound to the other – the so-called "melodic voice" – by strict rules." (<http://www.arvopart.ee/en/Arvo-Part/creative-periods/3>)

It could be like a break on the radio. Such signals sometimes sound as if they lasted an entire life. Or future, or past, outside time. Like I said: a blade of grass has the status of a flower.

To see in this tiny phrase, something more than just the black and the white key...

(plays first two notes in both hands)

And further...

(...next two notes...)

Hold that note....

(...starts playing again from the beginning...)

Its not the tune that matters so much here. It's the combination... (gestures with interlocking forefingers of both hands...) with this triad. It makes such a heart-rending union. The soul yearns to sing it endlessly. Listen... (plays opening bars of Alina) and so on...

(transcribed from Chapter 7: *Auftakt* in the film *24 Preludes for a Fugue* by Dorian Supin)

From Hillier's analyses of Pärt's tintinnabuli music, the melodic voice has come to be known as the M-voice; and the voice playing the notes of the triad as the T-voice. M and T voices present harmonic frameworks that can always be traced back to a single fundamental note, which can appear as a drone in the music. What is unique about tintinnabuli music is the use of the triad in the T-voice, which like Pärt's interlocking forefingers combines with the M-voice to make "such a heart-rending union. The soul yearns to sing it endlessly."

Hillier describes the music as using a blend of tonal and modal forces that results in a "tonal stasis". This stasis "sets it apart from conventional tonality, for the constant presence of the same triad neutralizes any functional capabilities of pitches outside it" (Hillier 1997, 92). Taking this statement to its logical conclusion, and through analysis of the music, it can be seen that once the tonal stasis is established with the triad and the scale anchored by the fundamental note or drone, an harmonic structure is set up within which there is great freedom for composition. In this system, where the harmonic relationship between notes in a vertical plane is "neutralised" by the triad, the composer is able to play with the movement of notes in a horizontal plane without

needing to consider harmonic progression. Conventional tension and resolution found in the relationship between dominant and tonic triads in tonal harmony is replaced by a shift between relative consonance and dissonance, related to the number of notes sounding within or outside of the tintinnabuli triad. As with the principle at the heart of religious praxis, through structure there is liberation.

When asked by Jamie McCarthy whether he saw a contradiction between “well-formulated principles of construction” and his “intuitive approach to music”, Pärt responded: “I don’t see it as a contradiction, since everything in the world is numerically arranged in one way or another” (McCarthy 1998, 133). This statement provides a vital indicator to understanding the underlying structure of tintinnabuli music. Pärt aligns himself here to a long line of philosophical thought within which music and numbers and the design of the Universe are all interlinked.

2.2 An interface for archetypal recognition of divine proportions

In his book, *Temperament* (2002) Stuart Isacoff gives an account of the development of musical tuning systems through the ages. As the book clearly shows, the idea of “numerical arrangement” in the universe has been an ongoing source of scholastic interest for many years. From the time of Pythagoras, the study of music, mathematics and the structure of the universe were all interrelated. For ancient Greek philosophers, music’s most beautiful sounds, arising from inviolable mathematical relationships represented nothing less than the fingerprint of the gods. Arithmetic, geometry, astronomy and music have long been studied together as a means of discerning and representing the essential design of the universe.

Through the course of his book, Isacoff presents the following important concepts in the history of Western musical thought: Pythagoras’ discoveries concerning the mathematical proportions of consonant sounds; Newton’s discovery of the relationship between light and sound; Rameau’s theory of the directional pull (like Newton’s theory of gravity) of tonal harmonies; the use of thirds in English folk singing practice in the thirteenth century; the proportions of Galileo’s pendulum; Kepler’s understanding of the “movement of the heavens” as “nothing except a certain everlasting polyphony”

(Isacoff 2002, 157) based on geometrical proportions (echoed more recently in the music of Urmak Sisask's astro-music); the principle of the harmonic overtone series where a fundamental note provides the foundation for the relationships between it and the musical notes that sound above it; and the most modern discoveries concerning the physical properties of matter in String Theory. As Charles T. Eagle (2001, 1) says, everything that exists can be related to a vibration. Everything can be seen as a Sonorous Body (after Rameau) – that is, a body that vibrates. Any body that vibrates produces sound, audible or inaudible to the human ear. It can be no co-incidence that all of these concepts can be found in Pärt's music. It is possible that the harmonic structure of tintinnabuli music 'works' precisely because it resonates with the most basic physical principles of sound. These principles could be one of the factors that relate to what Pärt discovered in his search for the 'spirit' in early polyphonic music.

Whereas Pythagoras' understanding of consonant intervals is based on mathematics, Johannes Kepler developed his theories based on geometric principles. In July 1595 he discovered that the ratio between two circles placed inside and outside a triangle, represented the same ratio as that between the orbits of the planets Saturn and Jupiter.

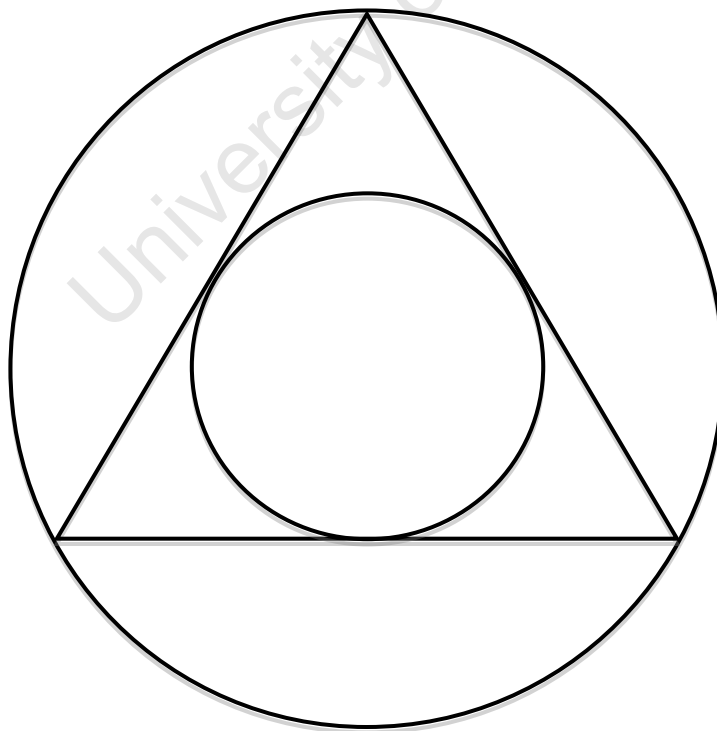


Figure 2.1: Ratio of circles with a triangle

Testing the idea further, he discovered that the ratios between the other planets matched the ratios obtained through similarly using the five Platonic solids – three-dimensional figures whose sides are all completely symmetrical. In an analysis of Kepler’s work, Walker describes how “the final step is to show by reasons drawn from geometry, that supreme set of archetypes which is coeternal with God, why these ratios and no others produce musical consonances” (Walker 1967, 232). Kepler started to make his assertions of the musical connection to this divine geometry with the discovery that the planets orbited around the sun on elliptical paths. The ratio between the nearest distance of the elliptical orbit of a given planet to that of its farthest could be approximated to certain ratios. For Mars this ratio is roughly 4:3; for Saturn 5:4; for Jupiter 6:5. These same ratios represent the intervals of a perfect 5th, a major 3rd and a minor 3rd respectively. Each of the planets produces a musical interval in this way. From this pattern, it would appear that the Universe is governed by the same proportions as the just intonation scale (Isacoff 2002, 155, 156). In other words, according to Kepler’s argument, the design of the Universe would appear to favour the use of triads, and intervals of thirds and sixths. Nearly 2000 years before this, Plato had claimed that: “the correct musical proportions reflect the vibrations of man’s inner nature, just as they mirror the harmony of the celestial spheres spinning in their orbits” (Isacoff 2002, 48). It is remarkable that Kepler should use the Platonic solids, named after Plato and referred to by him, to initiate his own theory of the proportions of the Universe and musical harmony – a theory that supported the essence of Plato’s original assertions about vibrations and musical proportions.

D.P.Walker describes how Kepler’s understanding of musical harmony was based on an acceptance of the ‘modern’ practices of polyphony and just intonation. As Walker recounts, Kepler justified this with two different arguments:

first, empirically, because an unprejudiced observer gifted with a good ear can realize that thirds and sixths are consonant – they will please and satisfy him because they correspond to the archetypes in his mind, and, by using a monochord, he can discover that their ratios are 5:4, 6:5, etc.; secondly, the investigator of nature can find these consonances in God’s creation, ... and thus

confirm his empirical knowledge and the instinctively natural, polyphonic practice of modern musicians. (Walker 1967, 232)

In the first 'empirical' justification, Kepler's acceptance of thirds and sixths as consonances sets him apart from the Pythagorean model of musical proportions (which renders the third and sixth as dissonant within a given scale), and puts him in agreement with the practice of 13th century English folk musicians, who used thirds and sixths because "People liked these sounds" (Isacoff 2002, 62).

Another interesting concept referred to in this quote is the concept of 'archetypes'. Kepler speaks of divine and human archetypes that can be reached through music. Music is understood to reveal the archetypal structures of the heavens, but not necessarily to imitate the celestial music, or to be derived from it. Rather, "both are likeness of the same archetypes, the geometric beauties coeternal with the Creator" (Walker 1967, 234). Kepler believed that these geometrical figures and proportions "do exist, as imperfect copies, in physical things; and the mind or soul recognises and classes them by comparing them with the God-implanted archetypes within itself. The mind recognises these proportions intellectually, the soul instinctively" (Walker 1967, 236 quoting Kepler with additional footnote reference 46). As discussed previously in reference to Martin Andersen's conversations with Veljo Tormis, responding to music can be seen as a process of recognition. In a socio-political context, the recognition is of codes and symbols of national identity. In a spiritual context that incorporates the study of divine proportions – the recognition is of codes and symbols of universal and divine archetypes; of geometrical and numerical figures and proportions; of consonant and dissonant vibrations. Through the 'mind' and the 'soul' this recognition can take place on both a conscious and an unconscious level.

In music, a creative circle initiated with the compositional process is completed in the performance of the music and its reception. Harmonic proportions chosen and placed within the structure of the music resonate with 'archetypes' within the listener. Through an interaction with the sound of the music, the resulting resonance of Kepler's "God-implanted internal archetypes" facilitates a process of recognition of "divine archetypes".

In the process of composition, Pärt chooses “a gesture” that could contain infinite mysteries of the universe. This gesture is one that cannot necessarily be expressed through words, but can be expressed, received and interpreted through music. In an interview conducted by Geoff Smith with Arvo Pärt and his wife, Nora, about “the sources of his musical invention and the compositional process”, the couple describes the process thus:

AP: The information coming from me is encoded in 'mathematical rules'...

NP:which do not require a translation back into verbal language.

(Smith 1999, 21)

By application of mathematical structure within the music, albeit inaudible, the music can become a window, an interface through which the internal archetypes within the human soul recognize and resonate with the divine geometry of the universe, without a word being spoken – and without any conscious decision to do so, apart from deciding to listen to music which could ‘sound nice’, or make the listener ‘feel good’. In fact, the ‘sounding nice’, and ‘feeling good’ could be seen to be more by sensitive and insightful design than by happy accident or coincidence.

Arthur Lubow wrote the following account of some time he spent with Arvo Pärt, while interviewing him for the New York Times Magazine:

He walked to the piano in a corner of the room and crashed out some loud dissonant chords, a bedlam of black and white keys. Then he used two fingers to pick out two white keys and play an open fifth, an interval that is a fundamental musical consonance, a sound that soothes and resolves.

“We read it in our hearts and minds,” he said. “And you can choose. The composer can choose what he needs. This is very primitive explaining, but it is so. Who can say it is not so?”(Lubow 2010, 6)

2.3 Schenkerian *Klang*

Spiegel im Spiegel (1978) provides a useful practical introduction to Pärt's harmonic language and the structure of his music. The harmonic structure is based around the overtone series arising from the fundamental note, F. On paper *Spiegel* looks like it could have been taken from a Schenkerian exercise, where the aim of the exercise could have been to demonstrate the musical potential of Schenker's notion of *Klang*. *Klang* is a German word, meaning, "sound" or "tone". Schenker defined it as a "primordial sonority: a chord that functions as a generating cell, usually the lower part of an overtone series coinciding with the major triad, the fundamental sonority" (Pandey 2005, 381). It is this "primordial sonority" that is similar to the bell sounds of the tintinnabuli music created by Pärt in *Spiegel im Spiegel*. Figure 2.2 shows an extract of the score of *Spiegel im Spiegel*, scored here for piano and violoncello. Figure 2.3 shows an extract from the score represented as a pitch map, demonstrating the structure of the piece. By re-imagining the pitches of the music it is possible to get a clearer picture of its design.

The image displays a musical score for 'Spiegel im Spiegel' by Arvo Pärt. It is presented in three systems, each containing three staves. The top staff of each system is a single bass clef staff with a 4/4 time signature, featuring a series of half notes. The middle and bottom staves of each system are grand staff notation, consisting of a treble clef staff and a bass clef staff. The middle staff contains a complex melodic line with many sixteenth notes, often beamed together. The bottom staff contains a simpler melodic line with quarter and eighth notes. The score includes various musical notations such as slurs, ties, and dynamic markings like 'p' (piano) and 'pp' (pianissimo). A large, faint watermark reading 'University of Cape Town' is visible across the middle of the page.

Figure 2.2 An extract from the last page of the score of *Spiegel im Spiegel*.

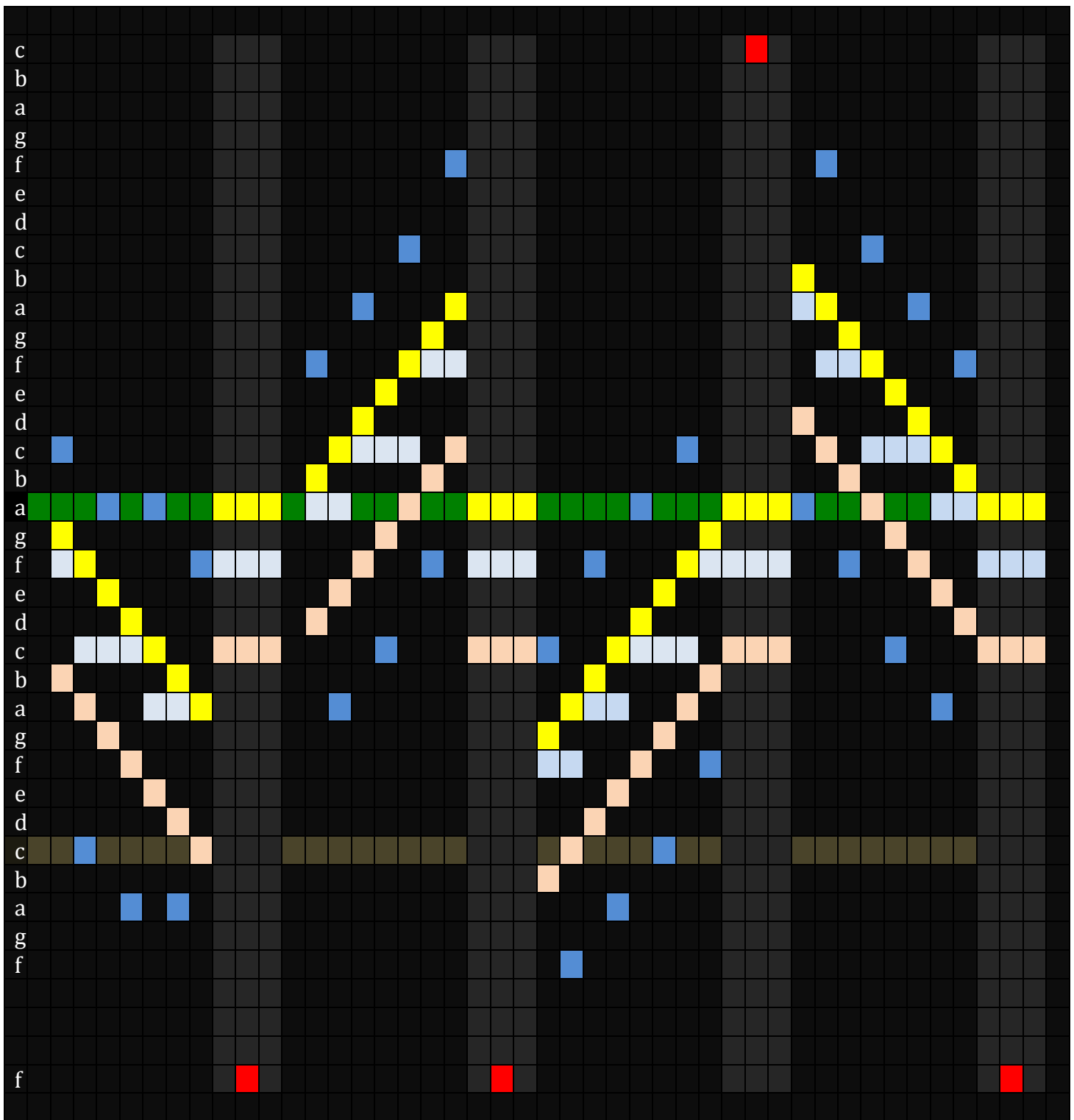


Figure 2.3 Pitch map of piano notes in *Spiegel im Spiegel*. Vertical axis = pitch. Horizontal axis = time. Each block represents a crotchet. Blue blocks = T voice. Yellow blocks = M voice. Red blocks = fundamental note (sounding an octave lower and played as an octave). Brown horizontal line = middle C. The section of the score in Figure 2.2 is represented in Figure 2.3 between the last two lighter grey columns. (M voice played by the violoncello is represented by the dark yellow blocks.)

From this pitch map the following points can be noted about the structure and design of *Spiegel im Spiegel*:

1. The horizontal green line shows the note around which the M voice is centered – A – the major third in an F major triad. This line also illustrates a horizontal axis around which the “mirror” image of the title operates.
2. The melody is made up of notes moving stepwise toward this point. This movement is either direct, inverted, retrograde or inverted and retrograde.
3. The lighter grey vertical columns represent the harmonic backbone of the piece with F as the fundamental bass, and the notes C, F, A played two octaves above it. These notes recall the Schenkerian *Klang* notes of the overtone series, as well as being the triadic ‘bell’ notes of tintinnabuli music.
4. The lighter grey vertical columns also form a second axis around which the “mirror” operates.
5. An additional reference to the overtone series occurs in the pattern of the fundamental notes (in red on the graphic). If one follows the movement of these notes through the whole score, the notes appear in the order f, f, c, f, the first notes of an overtone series. This pattern repeats itself, exactly, 4 times.
6. The T voice is made up of notes from the F major triad throughout the piece, alternating in register above and below the melodic line.
7. In the M voice there is a parallel movement of notes a sixth apart from the melody line. This would suggest a leaning towards Kepler’s concept of harmony using just intonation, where thirds and sixths are consonant harmonies.

Further justification for the design and structure of note patterns can be found in the practical demonstration of sympathetic vibrations heard on a string in the piano. If one holds down an F note of the piano keyboard in its lower register, leaving the string free to vibrate without having struck it, and then strikes the note C a fifth above and releases it, a sympathetic vibration is heard on the F string which corresponds to the C an octave higher than the C struck. This is shown in Figure 2.4. Continuing down a note at a time in the same fashion, the note B flat will produce the F above the first C, and the note A will produce the pitch A above the F. It is this exact arrangement of notes that Pärt uses in *Spiegel im Spiegel*. The descending line of struck notes could represent notes of the M

voice, while the notes heard as sympathetic vibrations represent the notes that sound in the T voice.

Sympathetic Vibration heard	C	F	A
Struck note	C	B \flat	A
String left free to vibrate	F	F	F

Figure 2.4: Sympathetic Vibrations heard on an F fundamental note

This exercise also demonstrates how there is more to music than meets the eye. Once again, one can refer here back to Martin Anderson’s conversation with Veljo Tormis. As with the *gestalt* theory where the whole is more than the sum of its parts, Anderson describes how although the music “looks deceptively bald on the page: the sense of growing excitement that immediately hits the ear isn’t always obvious to the score-reading eye” (Anderson 2000, 26). In music, then, notes can be heard which have not been physically played.¹¹ A “sonority” is activated through the process of sympathetic vibrations – a ‘primordial sonority’, which would presumably resonate within all ‘sympathetic’ ‘sonorous bodies’. So in the same way that sympathetic vibrations are activated in a string, it should follow that any body that has the ability to vibrate should be able to vibrate sympathetically. And because there is a music of sonorities based on the harmonic overtone series woven into the music, like an archetypal blue-print, which is not actually played by human hands, one could almost say that the archetypal vibrations of the universe and our own sonorous bodies are set into sympathetic motion by the vibrations activated by playing the music. The mirror can then be seen to be a symbol of a vibrational interface between inner and outer worlds.

Saale Kareda describes Pärt’s tintinnabuli music in the following way:

The tintinnabuli oeuvre of Pärt is created in accord with the ancient harmonic principles. It concerns the multidimensional core of the tintinnabuli style, the inner structure of tintinnabuli works, as well as the idea that the basic formulas

¹¹ This phenomenon occurs in folk music of many different cultures throughout the world, as in the practice of overtone singing and the use of overtones in the resonating gourd of the Xhosa *uhadi*, or musical bow.

of tintinnabuli music are connected with the human soul, as Arvo Pärt has stated. (2010, 3)

In this way, on a harmonic level, like the human soul, and like the Universe in which it exists, the music is consciously conceived to be so much more than the sum of its parts.

The structural process which unfolds in *Spiegel im Spiegel* is a stepwise movement through the addition of one note at a time to a given pitch row until it reaches the final pitch row as represented by the last descending scale (yellow notes in Figure 2.3). Through the piece, each statement of the pitch row appears regularly in retrograde, retrograde-inversion and inversion. In this way, every note in the piece is “pre-composed”. There appears to be no altering of the notes from their predetermined positions in the structure. Once the structure is set, the composer’s ego is withdrawn from the compositional process. One could imagine from this formulaic compositional technique would result a soulless piece of music. However, the opposite is the case. What is remarkable about *Spiegel im Spiegel* is its deep and profound ‘emotive content’, and its ability to mean different things to different people at different times and in different contexts.¹² Like the *Klang* of the harmonic framework, the structural devices also appear to carry an “archetypal” imprint that resonates with the human soul across so many different boundaries.

2.4 The *Klang* of bells

Schenker’s understanding of ‘primordial sonority’ and *Klang* focused more on the use of the major third than the minor third. The prevalence of the minor third in Pärt’s music would suggest other reference points for his harmonic language. These are not difficult to find if one looks to the experience of living in Estonia, as Hillier describes it – “wedged between the East (Russia and the Orthodox Church) and the West (Germany and Scandinavia)” (Hillier 1997, 24).

¹² *Spiegel im Spiegel* has been the topic of many seminar presentations and research papers, in particular in relation to its wide and varied use in the film industry for both feature films and documentaries. Scholars who have conducted research into this include Benjamin Skipp who speaks of the piece’s ‘emotive content’, and Michael Baumgartner. See websites: <http://www.bu.edu/apcsc/papersabstracts/>, <http://www.southbankcentre.co.uk/sites/default/files/documents/>

Marguerite Bostonia has studied Pärt's music from the perspective of the acoustics of Russian Bells. Her study reveals that it is not only the textures of sound emanating from a bell or a choir of bells that can be heard in tintinnabuli music, but also the complex sonorities and overtones that are set in motion when an untuned bell is struck. Comparing the overtone series of a bell to that of a vibrating string, Bostonia shows how the minor third occurs as the 3rd overtone in the overtone series immediately after the octave. This would make the minor triad an important natural harmonic texture in bell harmonics (Bostonia 2009, 30). Further, Bostonia's research highlights the important specific acoustical qualities of untuned Russian bells. In Russian bells "a natural sonic profile inherent in the original casting, and designed to be one of many artistic vehicles to symbolise emotions and spiritual presence" is considered by most Russians to be "an aid to participation in Divine Liturgy" (Bostonia 2009, 36).

So in a completely different context now, similar principles appear. The "sonic profile" is designed to be a vehicle for symbolising both 'emotion' and 'spiritual content'. Like with the concept of 'primordial sonority' and Kepler's reference to archetypal vibrations, a particular sound is seen to connect the human with the divine. The interesting harmonic concept is that the triadic focus is not limited here to the major third, but embraces the minor third as an important harmonic interval.

Cantus in Memory of Benjamin Britten (1977) provides another excellent example of the harmonic structure and design of tintinnabuli music. The work has overt and subtle references to bell sonority. It begins and ends with the striking of a bell. Commenting on bell sonorities and tintinnabuli music, Hillier says the following:

If a single bell is struck, and we contemplate the nature of its sound – the *Klang*¹³ at impact, the spread of sound after its initial gesture, and then the lingering cloud of resonance – what we hear takes us to the heart of tintinnabuli. (Hillier 1997, 20)

¹³ In reference to the sound of a bell, *Klang* here refers to an actual phenomenon – the sound of the bell ringing - rather than the concept of a 'primordial sonority' as presented by Schenker.

Cantus can be compared to the experience of listening to a single bell being struck, incorporating the *Klang*, the spread of sound and the ensuing 'cloud' of resonance. The piece begins with a real bell being struck lightly (at triple *piano*), which leads into around six minutes of a 'cloud' of resonance. All voices lead ultimately to their place in an overtone series. For *Cantus* this is built above an A fundamental with an A minor triad in the T voice and the A natural minor scale – or Aeolian mode – used in the M voice. At the end of the piece, the fundamental A is held by the double basses and violoncellos. In ascending pitch order above this, the violas play E, second violins play A and first violins play C. As with *Spiegel im Spiegel* the fundamental arrangement of notes in the orchestration reflects the overtone series. This chord is held in a prolonged triple *forte* wall of sound. When all strings stop playing, the sound of a single bell playing an A at double piano blends with the afterglow of sound from the strings. The timbre of the bell adds to the fading resonances of the thundering strings. All fade together as if one huge bell has been struck and the partials continue to vibrate on to an unidentifiable point.

Another way of looking at *Cantus* could be to imagine that a cinematographic technique is at play here. It could be that a stop frame/slow motion technique has been applied to the process of a bell ringing and set to play in rewind mode. From this perspective, *Cantus* actually starts then at the point where the vibrations of the struck bell are all fading away into inaudible *pianissimos*. In reverse, the sound then builds to the moment when the bell is struck, the loudest and most sonorous moment as all partials are at their fullest volume – the moment in real time which is the result of striking of the bell. Like watching a freeze frame of a flower bud opening – but in reverse – the listener is drawn into the exact moment when a bell is struck, and drawn also into all the symbolic and spiritual energy that is contained in the moment of the striking of the bell.

Pärt's use of harmony can be understood to be based on 'mathematical rules' that reflect both the structure of proportions within the universe, and archetypes with the human soul. With the establishment of a solid harmonic foundation, it is then possible to compose music without due consideration of the conventional rules of tonal harmony. Octaves, fifths, fourths, thirds and sixths are expressions of natural proportions rather than functions of tonal harmony; and the setting of a fundamental

tone with its associated triad provides a natural reference point to all the music that originates from it. This forms a harmonic unit free from analysis by rules of tonal harmony. As the harmonic structure is contained in this way, as with Pärt's *Passio Domini nostri Jesu Christi secundum Joannem* (1982), it is possible to have different fundamental notes (and their independently active harmonic units) playing at the same time. This gives rise to different sonorities happening concurrently, like a choir of different bells ringing at the same time, setting up complex and virtually un-mappable resultant harmonic and rhythmic patterns.

2.5 Harmony in *Summa*

In *Summa*, the given key signature is F#, suggesting an E minor tonality. T-voices use notes from the E minor triad throughout. The M-voices follow the E natural minor scale. The final chord is made up of octave and fifths: E's (bass and alto) and B's (tenor and soprano). The open fifth of E and B form an implied drone throughout the piece. They appear always as the first note at the beginning of each new entry of the voices. Harmonic stability or 'tonal stasis' is maintained by the continual resonance of the E minor triad in the T voice, the establishment of the implied drone on E and B, and by using only the notes of E natural minor scale in the M voice. From here, the placement of all notes in simple but highly organized pitch rows can be seen to relate entirely to structural considerations rather than any function related to tonal harmony. Any harmonies created through the movement of the M voices are a result of structure rather than harmonic intention.¹⁴ With the freedom to compose that this allows, it is also possible to focus more on extra-harmonic considerations in the music. The music can be designed and structured around visual rather than harmonic principles. For this reason it is appropriate to portray the music in the form of pitch maps, in order to demonstrate its structure and design.

¹⁴ Analysis of the structure also shows that there are places where Pärt deviates from a strict adherence to a given structure. It is possible that this could be related to an intuitive feel for a preferred sound.

3. Structure of *Summa*

Before drawing up the pitch maps for *Summa*, it is important to look at the overall structure of the work as it is scored. In an article by Nicholas Cook entitled “Musical Form and The Listener”, the connection between “how the music is experienced” and “what is visible in the score” is discussed (Cook 1987, 23 - 29). After first identifying the use of proportional schemes (in this case the use of the Fibonacci series) in the music of Machaut, Haydn, Debussy and Bartok, he goes on to discuss an understanding of musical analysis, which accepts (as with Schenkerian analysis) that music operates on different levels. Musical coherence is discussed as relating not only to the superficial configurations, which are visible in the score, but also to an underlying organisation that is both musical and psychological. For Cook, “musical form can be defined as the influence of the whole over the experiencing of the parts; it becomes not so much something that is perceived as a way in which things are perceived” (Cook 1987, 26). Although the form or overall structure of a piece of music cannot necessarily be fully identified when listening to the music, it is an ever-present ‘silent partner’ in the musical experience.

The structure of *Summa* will now be discussed under the following headings:

3.1 Title

3.2 Duration

3.3 Scoring

3.4 Text

3.5 Score layout

3.6 Numbers and patterns

3.1 Title

The published title of the work is “*summa*”¹⁵. “*Summa*” as a title for a treatise on Christian faith had been used before. The most notable example being by Thomas Aquinas in his *Summa Theologica*, also known as the *Summa*, which was written in the late 13th century. Thomas Aquinas’ *Summa* is an undertaking to present all of Christian theology systematically. (<http://www.ccel.org/ccel/aquinas/summa.html>) Pre-dating Thomas Aquinas, the first recorded attempt at a *Summa* of Christian Theology is attributed to St John of Damascus, dating to the 8th century (<http://www.newadvent.org/cathen/08459b.htm>). This encyclopaedic compilation of ecclesiastical writings, the *Fountain of Wisdom* is a more likely reference point for Pärt, given St John of Damascus’s connection to the Orthodox Church, his particular interest in music, and his treatises in defense of using Holy Images (religious icons). In addition, his hymns are still in daily use in Eastern Christian monasteries. It could be that Pärt in some way intended to continue this tradition of summarising the essence of all Christian theology and making it accessible in five and a half minutes of music, in his own “*summa*”.

3.2 Duration

The suggested duration of the piece is around 5 minutes 30 seconds (or 330 seconds, a mere suggestion away from 333 seconds).¹⁶ Hillier’s recording of the original score on the CD “*De Profundis*” in 1996, 19 years after it was written, lasts 6 minutes 28 seconds. A 1998 recording of the version scored for string orchestra (1991), on the CD ‘*Sanctuary*’, lasts the suggested 5 minutes 31 seconds. It is possible that the time is suggested according to numerical considerations, the number 3 being central to the structure and symbolism in the work.

3.3 Scoring

Summa is scored for mixed choir or soloists (SATB). It was first published in 1977, after having been originally composed for two solo voices (tenor and bass) and six instruments (Hillier 1997, 111). In 1977 Pärt was in the initial period of tintinnabuli

¹⁵ In *ARVO PÄRT, Collected choral works, Complete scores*, Universal Edition, 1999, the titles of the scores are usually printed without any capital letters, except when there is a word in the title referring to God.

¹⁶ This could relate to the number three as a significant religious symbol, and the use of the triangle as a generating form in the composition. The triangle can be seen as a symbol representing the Trinity, as discussed later.

composition, and it was in this time that he composed many of his most important and most often performed works (Hillier 1997, 75). This includes *Fratres, Cantus in Memory of Benjamin Britten, Arbos* and *Tabula Rasa*. Other vocal works composed in the same year were the *Missa Syllabica* and *Cantate Domino*. *Fratres, Arbos* and *Summa* have all subsequently been scored for different arrangements of instruments. Neither of the other vocal works from this time have been re-scored for purely instrumental ensembles, which would suggest something unique about *Summa*. *Da Pacem*, written in 2004/6 originally for mixed choir or soloists SATB has also been subsequently re-scored for a similar group of ensembles.

Subsequent scoring of *Summa* is as follows:

1990 Violin, 2 Violas and Violoncello

1991 String Quartet

1991 String Orchestra

2005 Recorder Quartet

2009 Saxophone Quartet

The original SATB version is written in E minor, whereas the instrumental versions are written in G minor.

3.4 Text

Summa is a setting of the Latin text of the *Credo*.¹⁷ Previous analysis of the work has shown how the structure is based upon the syllabic content of the text (Hillier 1997, 111) (Sander 2010, 1). The text of the *Credo* can be divided into 364 syllables. Throughout the work a single syllable is scored to a single note, either a crotchet or a minim. The crotchet syllables are at times subdivided into slurred quavers, and the minim syllables are at times divided into slurred crotchets. The setting of the words of the text and how the voice parts exit and enter are determined by the structure, rather than through any direct reference to the words. For example, the last syllable “-rem” of “*fac – to – rem*” is not sung by the soprano and alto voices in staff system 1. (See Figure 3.5.1) Similarly, these voices enter half way through the word, on the syllable “-o” of “*De – -o*”, later in the score. At the end of the text Pärt adds 4 notes to the “A-” syllable of *A-men*. The “-men” syllable is placed on an added note in a final bar on its own. Adding

¹⁷ The use of Latin text and a title that was not overtly religious was not unusual in the political context within which it was written.

(4 + 1) notes to the overall count of 364 results in the number 368 (+1). In this way, Pärt adapts the number of notes beyond the number of syllables in the text to fit his design of 'information encoded in mathematical rules'. A study of the score layout shows how this is used in the structure of the work.

3.5 Score layout, numbers and patterns

summa arvo pärt

The image shows the first two systems of a musical score for 'summa' by Arvo Pärt. The score is written for four voices: Soprano (S), Alto (A), Tenor (T), and Bass (B). The first system is marked with a circled '1' and the second with a circled '2'. The lyrics are: 'Cre-do in u-num De-um, Pa-trem om-ni-po-ten-tem, fac-to-rem coe-li et ter-rae, vi-si-bi-li-um, om-ni-um, et in-vi-si-bi-li-um. Et in u-num Do-mi-num Je-sum'. The score is laid out in two systems of four staves each. The first system (1) contains the first two measures of the piece, and the second system (2) contains the next two measures. The lyrics are written below the staves, with hyphens indicating syllables that span across notes. The music is in a simple, minimalist style characteristic of Pärt's 'tintinnabuli' technique.

Figure 3.5.1 Page 1 of the score

The score is laid out over 8 pages. Each page has the same structure as page 1. Each page has 2 staff systems of 23 syllables or notes each – $(8 \times 2) \times 23 = 16 \times 23 = 368$. The beginning of each new staff system has a score mark corresponding to the numbers 1 – 16. The last system, numbered 16 in the score, has the final syllable of the A-men as an additional note/syllable, in a final bar. The extra note/syllable brings the total number to 369. This could be another indication of the importance of the number 3 to the structure of the work.

Each Line of 23 syllables is grouped 7-9-7 where the group of 7 represents either soprano/alto, or tenor/bass in an alternating pattern on either side of the 9 syllable block, which is sung by the full choir. This pattern of voice entries is maintained in all subsequent scorings for different instruments, although how the score is laid out does not always reflect the two systems per page pattern. This pattern is shown below in Figure 3.5.2:

staff system (1 – 15)			
S A	7	9	
T B		9	7
S A		9	7
T B	7	9	
staff system (2 – 16)			

Figure 3.5.2: Distribution of 23 syllables through the voice parts in *Summa*. Each page of the score has 2 staff systems (Numbering 1/2, 3/4, 5/6, and so on) with an odd numbered system always placed above an even numbered system on the page as represented in the table.

This arrangement of the score gives the first clue to Pärt's use of patterns and numbers. As can be seen from Figure 3.5.2, each of the 8 pages of the score depicts a shape like an arrow-head, or a triangle. The arrow-heads point forward in the direction the music flows. The triangle is a shape that is central to the overall structure of the piece, and the number 3 appears also to be central to the structure of *Summa*. Given that the text, the Latin *Credo*, is a statement of belief in the Holy Trinity, the structural use of a triangle would seem a highly appropriate choice to represent the concept of God as the Trinity, three in one.

Pärt has described his process of composition as follows:

A composition comes as a single gesture which is already, in essence, music... If this gesture, like a seed, takes root, it must be cultivated with extreme care so that it may grow... The compositional task is to find the appropriate system for the gesture. (Duckworth 1999, 167)

Two important elements can be extracted from this statement. Firstly the “gesture” represents what he refers to in other places as an intuitively found “nucleus”, from which the composition will emerge out of “the profundity of consequences” (Smith 1999, 19 - 25). Secondly, the “appropriate system” refers to the careful attention paid to the details of structure in the music – the structure that is ultimately liberating. In combining intuition and consequence with detailed structure, we are also reminded of Pärt’s concept of ‘linking the head to the heart’ (McCarthy 1989, 131).

It is clear from the overall structure of the score that the soprano and alto parts operate as a unit; as do the tenor and bass parts. This is in keeping with the format of tintinnabuli music where two parts co-exist: the M-voice holds the melodic line, while the T-voice expresses the tintinnabuli line. This has given rise to the formula applied to tintinnabuli music of: “1 + 1 = 1”. This formula indicates how the two different voices combine to become one voice (Hillier 1997, 96).

Another interesting use of numbers and patterns in the structure of *Summa* can be seen if one separates out each pair of M and T voices (SA and TB). Each pair holds the melody for 16 syllables (which overlap in the section of 9 syllables). So for each pair of voices there are 16 notes in 16 lines of music resulting in an overall structure of a 16 x 16 point square – which, as with any square, can be subdivided into two equivalent triangles as shown in Figure 3.5.3.

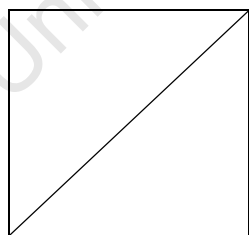


Figure 3.5.3 A square subdivided into two equivalent triangles

Through looking at the use of numbers in the construction of *Summa*, it can be seen that the text is used to form the basis of a numerical framework for the composition. This numerical framework is in turn used to create patterns that become symbols relevant to the text. It is in the way that Pärt uses patterns and numbers to mould the structure of the music that the symbolism behind the words plays itself out.

4. Pitch maps in *Summa*

Following on from the earlier structural analysis is the presentation of a process of pitch mapping. The pitch maps create a visual image of the pitch rows used in *Summa* in both M- and T-voices. The starting point for this process assumes the basic structure in *Summa* of:

1. 8 pages in the score, with 2 staff systems per page
2. score layout of 16 staff systems, each with 23 syllables/notes
3. each staff system has two M- + T-voice units –
SA (S = T, A = M) + TB (T=T, B=M)
4. each MT unit has 16 syllables/notes per line
5. displacement of MT units according to the given pattern in a line of music results in 23 notes per line: $7 + (9) + 7 = 23$ – where (9) represents where the MT units overlap
6. M-voices are always Alto and Bass (AB)
7. T-voices are always Soprano and Tenor (ST)

The following discussions of pitch maps of *Summa* will be presented:

- 4.1 M-voice pitch row square
- 4.2 M-voice pitch maps AB16
- 4.3 M-voice pitch maps AB23
- 4.4 T-voice pitch maps
- 4.5 Deviations
- 4.6 Full score pitch maps

4.1. M-voice pitch row square

Figure 4.1.1 presents the 16 pitches in the Alto part, placed on the horizontal axis and presenting a pitch row that undergoes transformation in the different staff systems of the music.¹⁸ The vertical axis represents the 16 staff systems of the score. Each pitch is assigned a block and a colour. The first vertical line presents how each entry of the alto voice starts on the pitch E, regardless of its position in the transforming pitch row. This demonstrates Pärt's use of an implied drone on the fundamental note. The E does not sound continuously like a pedal point. However, both visually (in this pitch map) and aurally, it becomes an important reference point in the music. This also shows how Pärt adapts a given pattern to facilitate harmonic stability. The establishment of the implied E drone provides harmonic stability without detracting from the design.

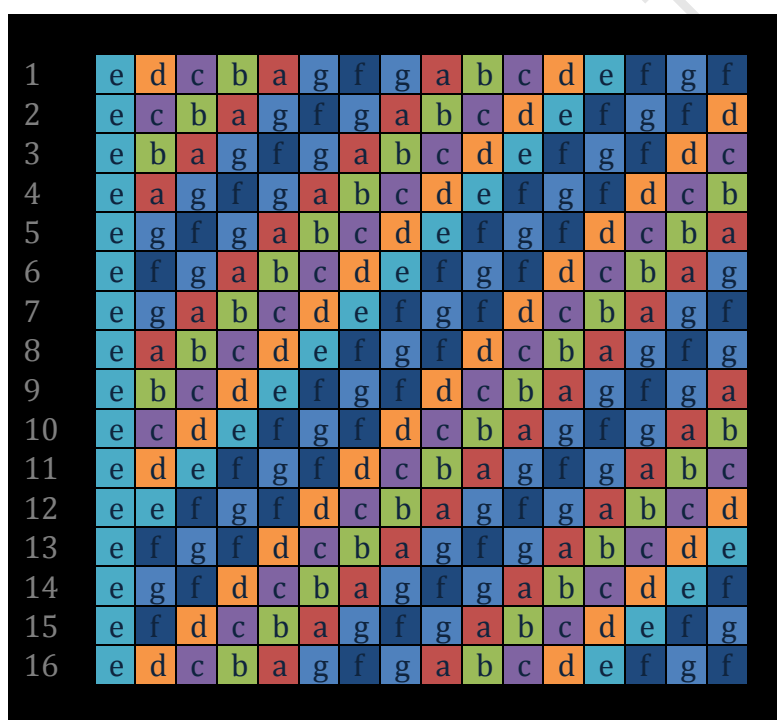


Figure 4.1.1 Alto pitch rows in *Summa*

If the vertical line of E is removed and replaced with the logical extension of each pitch line, a slightly different graphic would be created. (See Figure 4.1.2) Apart from the overall obvious shapes of triangles and squares, another interesting phenomenon emerges. The order of pitches on each of the outer edges of the square is the same –

¹⁸ A similar pattern is apparent in the Bass pitches with the same properties and possibilities.

from left to right and top to bottom. In other words, the pattern of pitches repeats itself in both the vertical and horizontal planes. In this way a cycle is set in motion. Line 1 and Line 16 are the same. Line 1 has been gradually transformed a note at a time to become Line 16. Kurt Sander compares this process of row transformation to the life of a religious initiate, where although there is no physical change between line 1 and line 16, nevertheless there has been a process of transformation that has taken place (Sander 2010, 1). This process, if it was not stopped by the final cadential bar at the end of line 16, could continue repeating itself like a circle spinning eternally. Moreover, the circle exists in both the vertical and the horizontal plane. To the square and the triangle is thus added another basic shape – the circle. This circle can be known to exist, but is not visible in the music or in the two-dimensional pitch map. It exists as an abstract, but real concept, which is integral to the music, but which is neither visible nor aural.

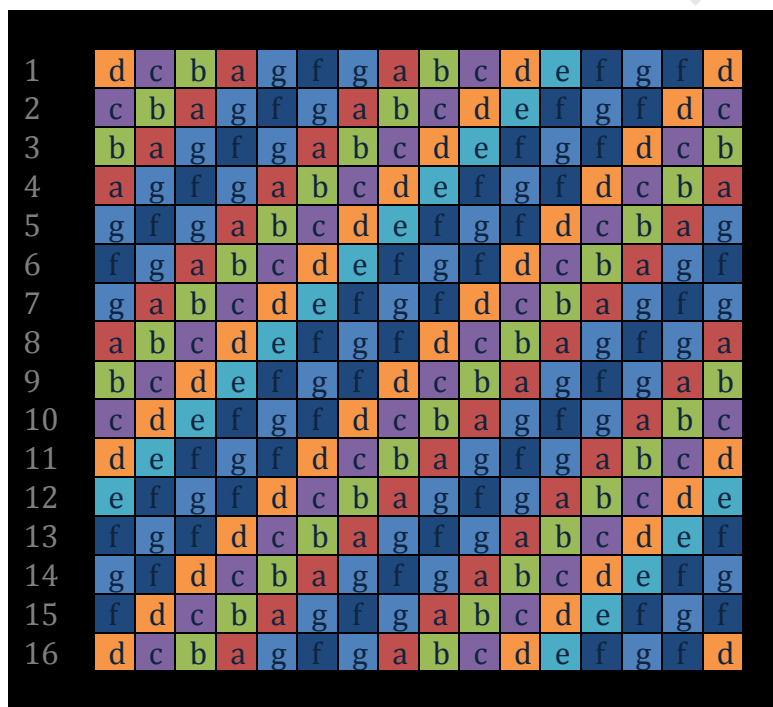


Figure 4.1.2 Alto pitch row without the E vertical line. This clearly shows a square divided along a diagonal, producing a visual interplay with triangular patterns.

This structure also shows some similarity to a phenomenon, known as the Sator Square (Strauss 2008, 3), found originally in the ruins of Herculanaeum, and dating to 79 AD. (See Figure 4.1.3)

S A T O R
A R E P O
T E N E T
O P E R A
R O T A S

Figure 4.1.3 The Sator Square

This ancient symbol, showing a play upon words, geometrical alignment and pallindromic patterns is believed to have magical properties. It is believed to be able to facilitate protection against evil spirits, and to have particular significance for early Christians – representing a secret sign of the presence of Christianity in the context of Roman intolerance and persecution. It is possible that a symbol that exists within its code is a cross, made of the words “pater noster”. (http://orderofcenturions.org/documents/rotas_square.html) (See Figure 4.1.4)

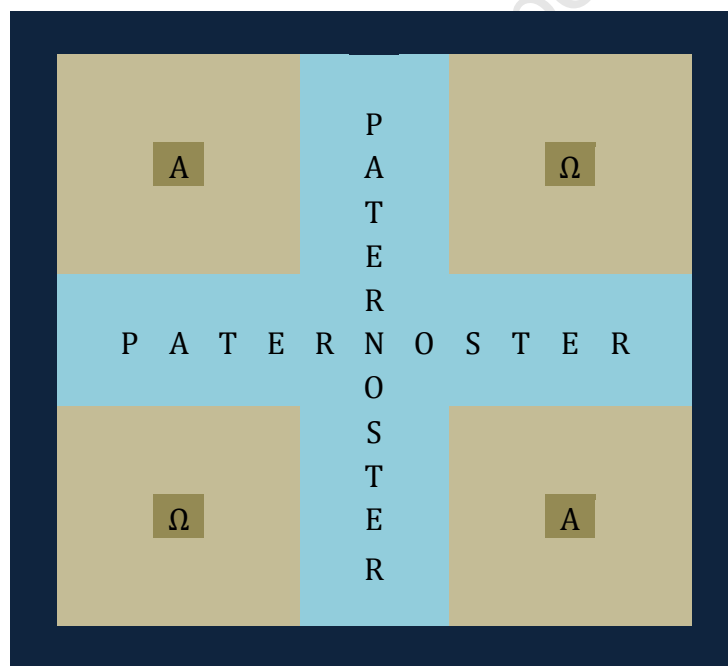


Figure 4.1.4 Re-working of the Sator Square

This is made from the letters in the words of the square, leaving two remaining letters: A and O – corresponding to the first and last letters of the Greek Alphabet, A and Ω, symbols of the eternal nature of God.

Similar devices of palindromes, inversions, retrogrades and retrograde inversions are all prevalent in early polyphonic music, notably in the music of Obrecht and Machaut whose music Pärt is known to have studied. It is possible that in *Summa*, Pärt has constructed his own symbolic presentation of Divinity.

This representation of Divinity could be set in the music as its energetic foundation. It could be acting both as an icon drawing attention to a real, but invisible God; and also as a secret symbol of identity in a society where religious expression was not tolerated. The significance of this is highlighted by a return to Cook's assertion that "musical form can be defined as the influence of the whole over the experiencing of the parts; it becomes not so much something that is perceived as a way in which things are perceived" (Cook 1987, 26).

Summa's 16 x 16 pitch square pattern is based on the development of a row of notes, but does not give an indication of the relative position of the pitches. For this a new visual map is required. These maps reveal further patterns within the score.

4.2. M-voice pitch maps AB16

Another way of looking at the 16-note pitch row is to map the individual lines according to relative pitch. Starting with the Alto pitches (M-voice) as they appear in the score:



Figure 4.2.1 Alto line as written in the score for line 1

The pitches can be placed on a pitch map where the vertical axis shows pitch value, and the horizontal axis shows the notes.¹⁹ This would result in the following pitch map for the Alto voice in line 1 (and line 16) of the music:

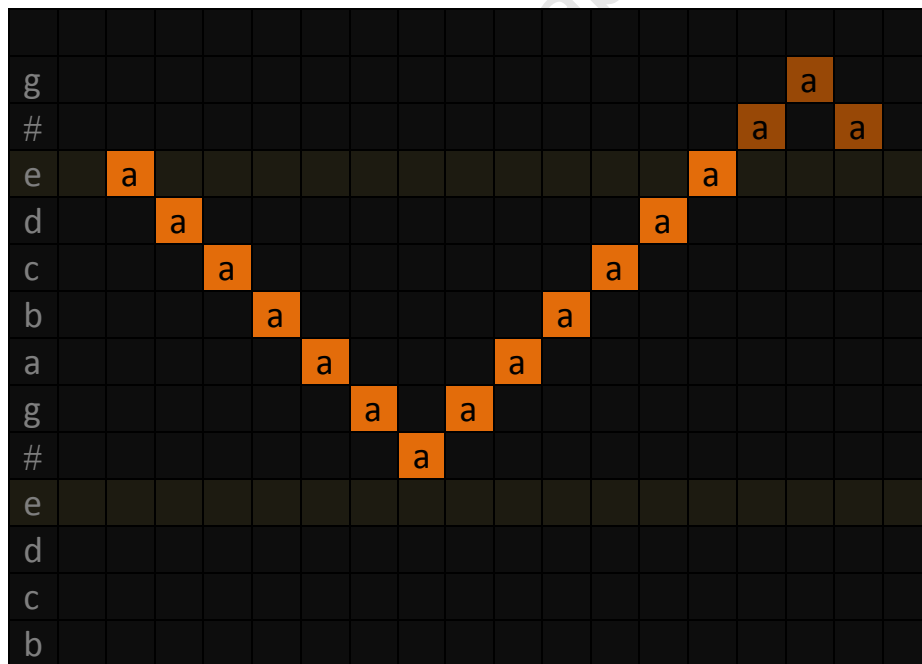


Figure 4.2.2 Alto Pitch map for line 1 (16)

¹⁹ Where there is a slur to another pitch in the score, these pitches are omitted from the map as they are seen as not being part of the M-voice pitch row. The function of these notes in the music does not directly affect the organisation of the syllabic/numerical pattern. They can be seen as T-voice additions as they are always notes derived from the T-voice triad. Analysis of these notes could reveal another pattern devised by Pärt, related also to note durations.

The pitch row starts on and leads back to the fundamental note E. There is both geometric and numerical symbolism in the row. The numbers 7 and 9 are once again important. The row descends for 7 pitches, and then rises for 9 pitches, before coming down one pitch to complete the cycle back to E. The row is made up of two triangles. The bigger 13-point triangle shape descends and rises to E. The smaller 3-note triangle sits above the 'E-line', and leads back, to E.

The numerical arrangement is simple and elegant. Starting with the smallest unit, the 'single gesture' already suggested – a 3-point triangle (possibly representing The Holy Trinity) – the second 13-point triangle (possibly representing Christ and the 12 apostles) is added. The larger triangle has its foundation in E (possibly representing Earth, Estonia, *Erde*, *Ecclesiam*²⁰), while the smaller triangle is poised above E (literally and metaphorically). Once again the triangle is presented as a 'nucleus', which is nurtured within the structure, so that it can grow into the shape of the composition. Within the triangle-generated pitch row, the symbolic numbers of 3, 13, 7 and 9 are skillfully woven.

Moving now to the Bass pitches (M-voice) as they appear in the score:



Figure 4.2.3 Bass line as written in the score for line 1

Figure 4.2.4 shows the Bass pitch map, formulated in the same way as the alto pitch map. This pattern is a direct mirror image of the Alto pitch row. In the score, the bass voice actually starts after 7 notes in the alto voice. Pärt takes the pitch row first used in the Alto voice and develops it using an inverted canon. This is discussed further in the following section.

²⁰ This reference to E would not apply to the instrumental arrangements of the score, which are scored in G minor.

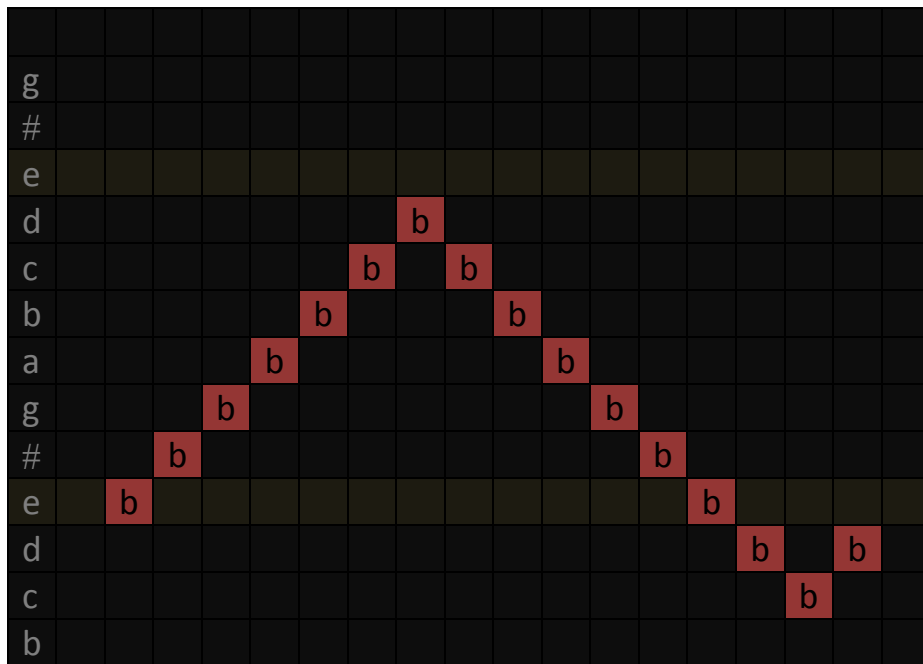


Figure 4.2.4 Bass pitch map for line 1 (16)

If the Alto and Bass parts are placed at the same starting point the mirror-like inversion can be clearly seen, as in Figure 4.2.5

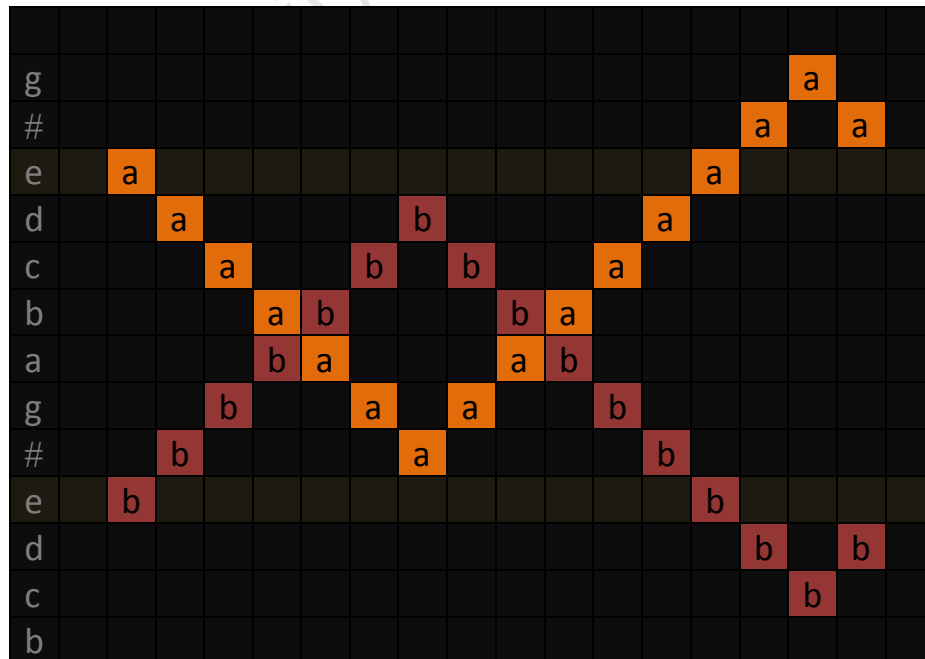


Figure 4.2.5 Pitch map showing inversion of Alto and Bass parts line 1 (16)

Taking this pitch map of line 1 as a starting point; if one follows this pattern down the 16 lines of music as it is transformed and comes back to itself, (see full print out in Addendum 1, with animated version on Addendum DVD: M-voice pitches AB16) another phenomenon occurs. Each frame acts like the frame of an animated motion picture where all reference points are fixed, and the only moving part is the pitch row. What happens is the pitch row pattern moves backwards while the music is moving forwards. The E pitch, which occurs at the beginning of each line, is clearly seen as a stable reference point as the pattern changes. As the combined triangular shapes move through the frame of focus, various possibilities are suggested (and open to the subjective interpretation by the viewer). Each line could represent a wave pattern, like a sound wave. The combination of the triangular patterns could suggest a fish swimming through water. This is most evident in staff system 8 - half way through the piece and corresponding to the words: *(Cru-)cifixus etiam pro nobis sub Pontio Pilato passus et sepultus est.* [tr. He was crucified for us under Pontius Pilate, suffered and was buried] (See Figure 4.2.6) Given the connection of the symbol of the fish with Christianity, this would be highly appropriate in the context of *Summa*.

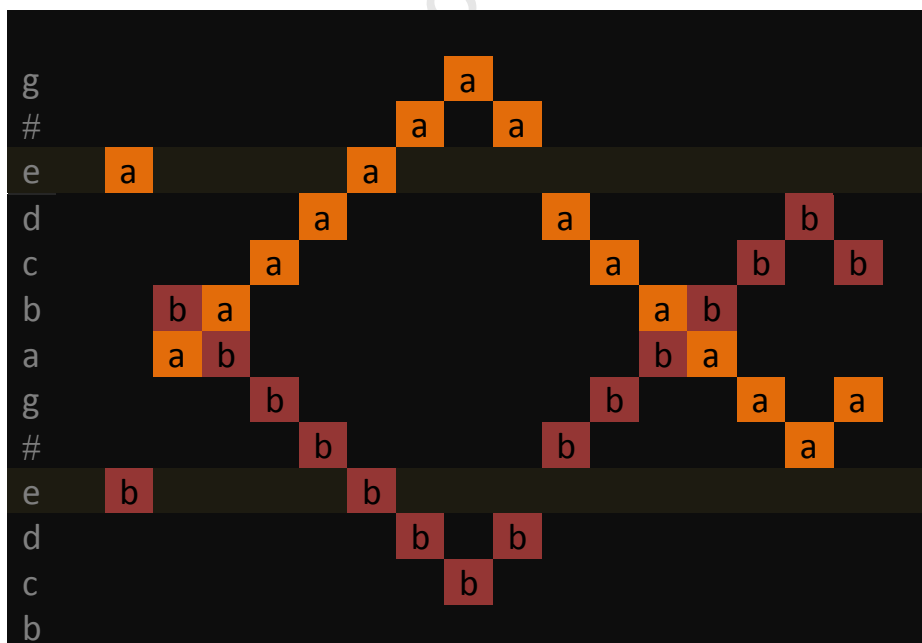


Figure 4.2.6 Combination of Alto and Bass pitch rows for line 8

The triangle, the 'seed' planted, has now grown into something much more than itself. However, as this is not how the notes of *Summa* actually appear in the score, this pattern would have to be itself a generating unit rather than an endpoint in the creative process. How the pitch rows appear as written in the score reveal further patterns that can be seen as developments of this idea

4.3 M-voice pitch maps AB23

The following pitch maps place the notes of the M-voices in a grid of 23 notes, as they appear in the score. (See Figures 4.3.1 and 4.3.2) In the maps the vertical grey columns show the 'bar-lines' in the score of 7,9,7 syllable notes. This does not correspond to measures based on note duration, as a syllable could have one or two counts assigned to it, as determined by a separate pattern. Horizontal brown lines show the position of the fundamental note E around which each pitch row is formed. The E for the Alto part is one octave higher than the E for the bass part.



Figure 4.3.1 Pitch map of Alto voice in 23 note grid for line 1

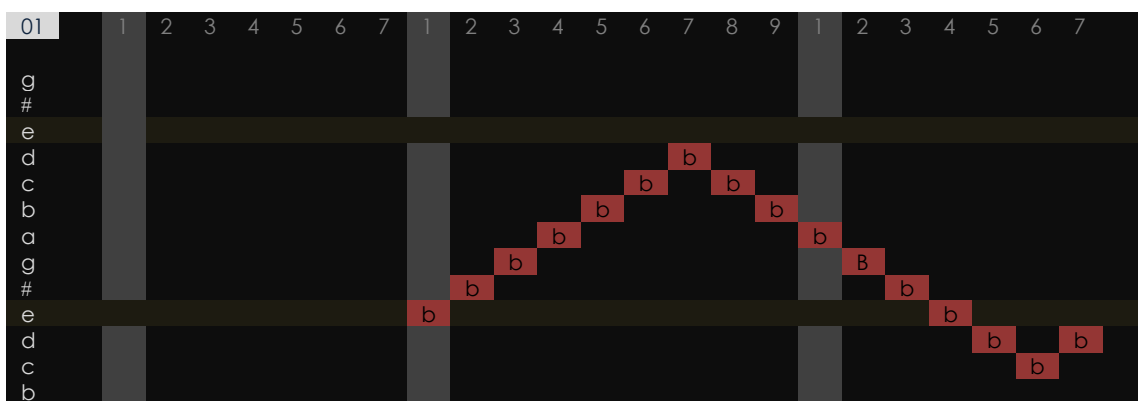


Figure 4.3.2 Pitch map of Bass voice in 23 note grid for line 1

The pitches can now be seen as a canon in inversion (See Figure 4.3.3). As the pitch row transforms from Line 1 through to Line 16, so the canonic structure continues. However, unlike a conventional canon, the order of entry of voices alternates. Line 2 begins with the Bass voice followed by the Alto voice. (See Figure 4.3.4) In this process of transformation, line 1 and line 16 have the same pitch rows, but differ in that in line 1 SA enter before TB, whereas in line 16 TB enter before SA. Returning to Sander's analogy of the life of a religious initiate – although there is no physical change between line 1 and line 16, nevertheless there has been a process of transformation, and the initiate/line is now seen in a different setting, which also causes the initiate/line to be seen in a different light.

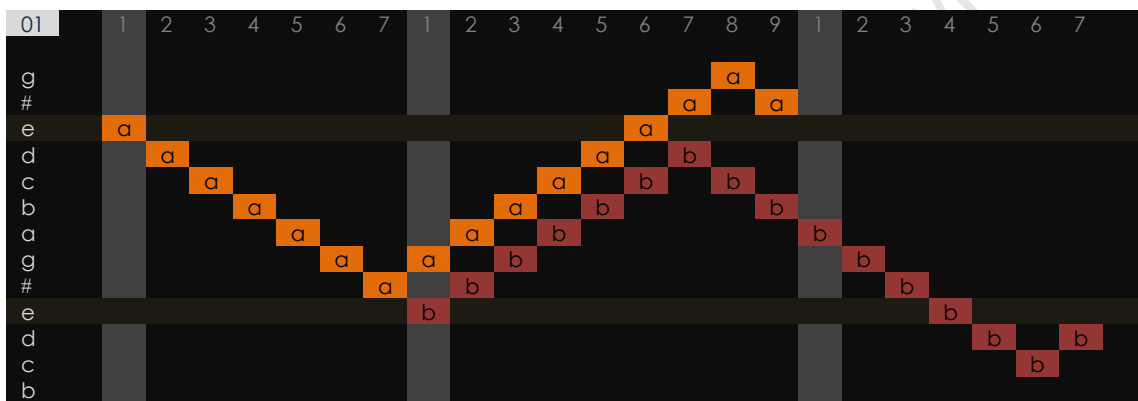


Figure 4.3.3 Pitch map of Alto and Bass voices in 23 note grid for line 1

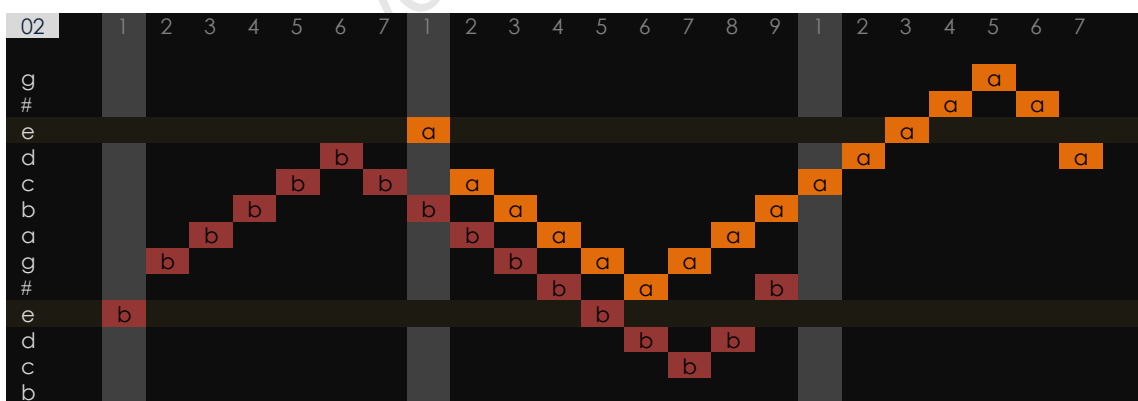


Figure 4.3.4 Pitch map of Alto and Bass voices in 23 note grid for line 2

As line 1 and 2 occur on a single page in the score, the inverted image or 'mirror' is extended to operate between the staff systems. Line 2 appears to be an inversion of line 1, although not exactly – due to the displacement of one note in each pitch row.

Now, in a different form, once again the fish appears. This time the outline of the image is made up of both voice parts in combination between line 1 and line 2. On page 1 the fish appears to be facing in the same direction as the music. On each new page the image is slightly transformed. Ultimately the image becomes itself again as the pattern on page 8 logically precedes and flows into the pattern on page 1. As before, each page can act as a freeze frame in an animated moving picture. With this 'movie' the image becomes more sophisticated. If the eye follows one line at a time, each voice part and each line could represent a sound wave pattern. The combined effect of both voices on both lines is of two interlocking fish images swimming head into tail in the opposite direction to the flow of the music. (See Addendum DVD: M-voice pitches AB23)

Establishing a stable harmonic framework in tintinnabuli music allows the freedom to create a visual world that can never be "heard" directly in the music. This visual element could well be a significant part of the 'spirit', or the 'enigmatic' element in the music. From a semiotic perspective, one can enter the world of signs and symbols and codes used in works of art. From a hermeneutical perspective, an examination of the context in which the composition was created reveals an environment where placing codes within music was common practise.

The idea of encoded messages in art exploded into global popular consciousness with the book *The Da Vinci Code*, by Dan Brown. Brown was clearly onto a good thing, with many novels sold, a movie franchise and Hollywood glamour to follow. There is something fascinating about a mystery existing larger than life right before our eyes, without us even being aware of its presence. According to *The Da Vinci Code*, the *Pyramide d'Louvre*, the steel and glass pyramid structure at the entrance to The Louvre Museum in Paris, harbours a great secret of religious significance (which is really more a construction of creative license than anything based in fact). Whatever the symbolic significance might be, a visit to the site in Paris reveals a structure of incredible beauty, created around numerical proportion and geometry. It is possible to experience this

without any reference to underlying symbolism, but would this or any other similarly created work of art have the same impact without the encoded symbolism on which it is constructed?

In an examination of Leonardo Da Vinci's *The Last Supper*, for example, one is not necessarily immediately aware of all the symbolism and encoded messages woven into the construction of the work. Closer examination reveals an intricate network of proportions at play in the picture. Thomas Brachert describes how Da Vinci uses numerical proportions in *The Last Supper*:

Instead the pictorial plane represents – and here we encounter Leonardo's primary compositional interest in employing numerical proportions – an alternating interpenetration of the *divina proportione* with the Pythagorean intervals, which radiate as a harmonic diagram in the sense of a *musica mundana* from the universal center, Christ. The profound significance of this geometrico-cosmological conception from the tradition of the Late Classical Neoplatonists was well known to theoreticians of the Milanese court academy. (Brachert 1971, 465)

In a reverse scenario of the concept where unheard visual images can exist in music, Brachert illustrates how musical proportions be seen but not heard in art. The common thread here is in the 'geometrico-cosmological' conception of the universe.

Around the same time, and geographically near to him, as Leonardo was working on *The Last Supper*, Johannes Ockeghem was working on his *Missa Prolationum*, a setting of the Mass based on the use of mensuration canons, the same technique used by Pärt in *Cantus in Memory of Benjamin Britten*. After the death of Ockeghem, Josquin Des Prez wrote a motet based on the words of a poem known as "*La déploration de la mort de Johannes Ockeghem*". In a study relating Josquin's work to that of Leonardo, Bojan Bujic speaks of "eye music" employed in the composition of Josquin's homage to Ockeghem, a technique he describes as also being used by the Italian Madrigalists in the second half of the 16th century (Bujic 1973, 147). This "eye music" can operate on two different

levels. The most concrete example is in the use of all black notes in Josquin's composition, to "emphasize the sense of grief". Further examples of "eye music" which can be heard, would be relating words to movement in a piece of music – so words indicating "descent" would be represented with a descending scale, and a movement to the "heights" in the text could be accompanied by a jump in pitch.

The process of *soggetto cavato* is a more subtle process, the origin of which is attributed to Josquin des Prez. In *soggetto cavato* pitch is 'suggested' by the words in a text. Josquin's famous example was in composing a *cantus firmus* for a mass dedicated to the Duke of Ferrara by using his name to 'suggest' the notes. (See Figure 4.3.5)

Her	cu	les	Dux	Fer	ra	ri	e
re	ut	re	ut	re	fa	mi	re
D	C	D	C	D	F	E	D

Figure 4.3.5 Table showing how the Duke of Ferrara's name suggested the notes for a *cantus firmus*

As with *Summa* the concept of assigning one syllable to one note is also used in this technique. A similar technique provides one of the most famous musical examples in Western art music, in the use of B - A - C -H as a pitch row. This is another musical idea that Pärt has used, particularly in his earlier compositions.

Looking further into the use of symbols, and in keeping with symbolism used in visual art by Leonardo and his contemporary artists, Bujić proposes that the use of a descending third pattern by Josquin relates to the same visual concept as that of the *scala peccatorum* (the 'stairs of the sinners', representing a path of both human ascent to heaven, and the flow of God's Divine Mercy to Earth). This image is depicted in the works of Leonardo and of Filippo Lippi dating to the same time period.

Bujić speaks of composers of this time, including Ockeghem, as all sharing "a clearly demonstrated love for playing with musical notation as an applied science of numerical proportions" where "the majority of these intellectual devices were not meant to be discerned by the ear" (Bujić 1973,147). 'Eye music' of the 16th century is another phenomenon where the whole is more than the sum of its parts. Perhaps it is in the very

technically precise proportional mechanism at play in this music, and in Pärt's music nearly five centuries later, which, 'linking the head to the heart', holds the key to what Pärt might have identified as the 'spirit' of the music – music that through its design acts as an icon for a “geometrico-cosmological conception” of the Universe.

Returning to tintinnabuli music and *Summa*, Hillier states that the composition of the M-voice always comes first (Hillier 1997, 95). This provides a good reason to have started this analysis of *Summa* by looking at the M-voices. Hillier also describes the T-voice primarily in terms of its harmonic function and its pitch relationships to the M-voice – in 1st or 2nd position above or below the M-voice or alternating above and below it. This can be clearly seen in many tintinnabuli compositions with *Spiegel im Spiegel* providing a good example. This almost suggests a dependence of the T-voice on the M-voice for its construction. If this were the case, then it should follow that the T-voice patterns in *Summa* would follow the same patterns of construction used for the M-voice, and therefore would not warrant much separate discussion. Analysis of the T-voice in *Summa*, however, shows a different picture.

4.4 T-voice pitch maps

If the T-voice pitch row pattern was dependent on the M-voice pattern then it should fit into the regular 16 x 16 square grid, and be traceable according to the movement of the M-voice. How the Soprano and Alto voices move and relate to each other in line 1 is shown in Figure 4.4.1 (score) and Figure 4.4.2 (pitch map)²¹

The figure shows a musical score for the first line of a piece. It consists of two staves: Soprano (S) and Alto (A). The lyrics are: "Cre - do in u - num De - um, Pa - trem om - ni - po - ten - tem, fac - to". The Soprano part starts on a G4 and moves through various intervals, while the Alto part starts on a G3 and moves in parallel motion with the Soprano.

Figure 4.4.1 Soprano and Alto lines as written in the score for line 1

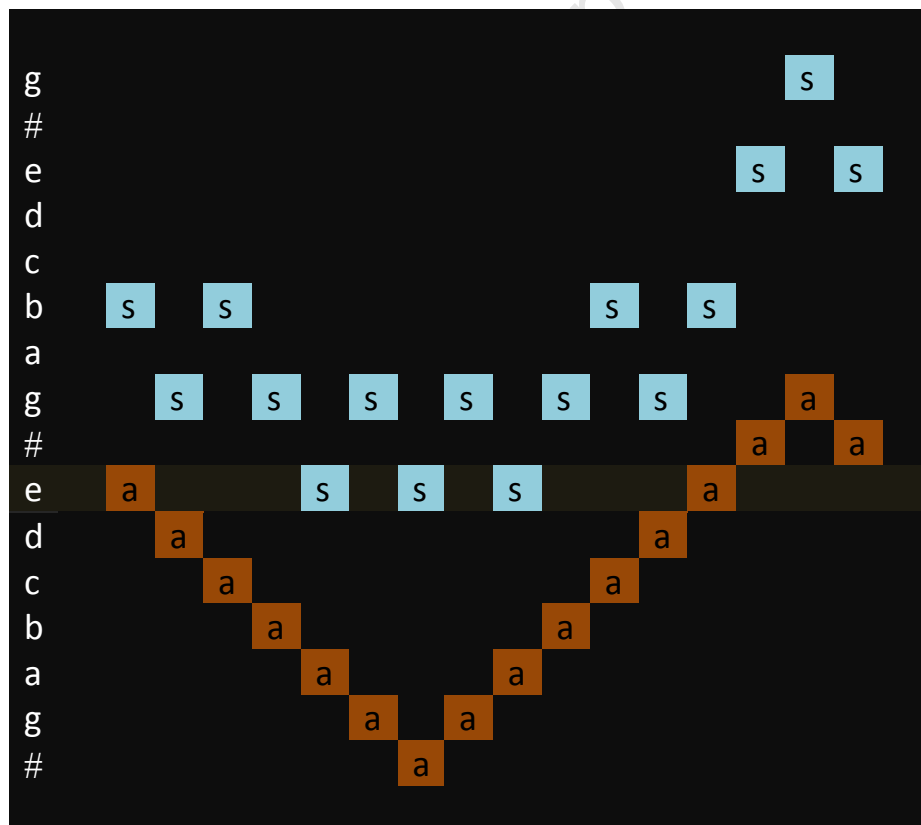


Figure 4.4.2 Pitch map of Soprano and Alto voices for line 1

²¹ Once again, slurred notes in both voices are not included in the pitch map.

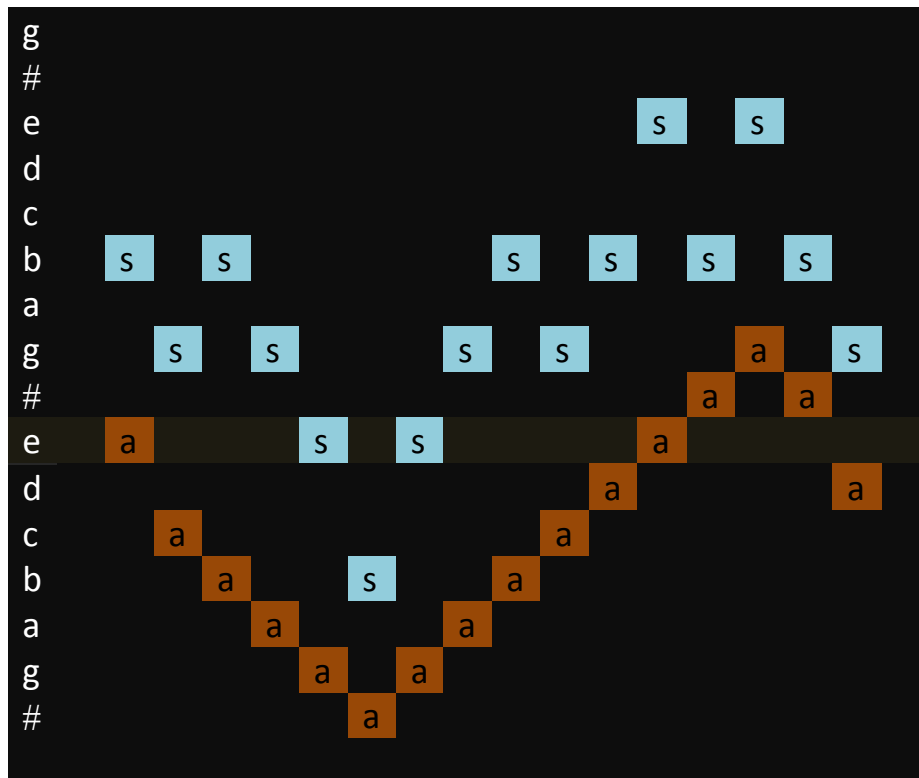


Figure 4.4.4 Actual pitch map of Soprano and Alto voices for line 2

The first step in an independent analysis of T-voices would be to recognise the notes of the triad used for the T-voice as being consecutive notes within their own frame of reference – i.e tintinnabuli notes 1, 2, 3 would equate to actual notes 1, 3, 5. Thus for the triad using the notes E G B, these notes could appear as consecutive points on a grid as shown in Figure 4.4.5. This allows an easier reading of the pattern of the T-voice pitch row. This basic structure of the pattern is again of 16 notes that move up and down in consecutive steps.

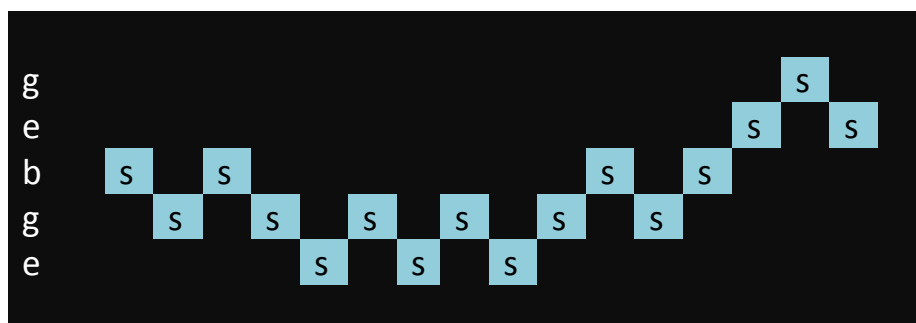


Figure 4.4.5 Pitch map of Soprano voice, using E G B as consecutive notes, for line 1

Addendum 1 shows how this pattern works itself out in the whole of *Summa*. Through plotting the T-voice pitch rows for each line of the score it becomes apparent that Line 1, 3, 5 and following odd numbers are made up from a pitch row which transforms regularly from one line to the next. Two notes are added to the end of the row and two notes are lost from the beginning of the row with each new line. Line 2, 4, 6 and following even numbers follow the same pattern. The line 1 T-voice pitch row is extended into the line 2 row to become one unit over 2 lines. Line 3 and 4 can also be joined in this way, and all following lines. This is a similar process used for the transformation of the M-voice pitch row, but is not the same

The result of this pattern is that on each page of the score (2 lines) there is a 32 (16+16) note T-voice pitch row. With each new page (7 new pages) 2 notes are added to the row. This results in an extended single pitch row which is made up of $32 + (7 \times 2) = 46$ notes. Each line now is a snapshot of this one row at different and consecutive points along the row. (See Figures 4.4.6 and 4.4.7 showing the complete pitch map over 46 pitches)

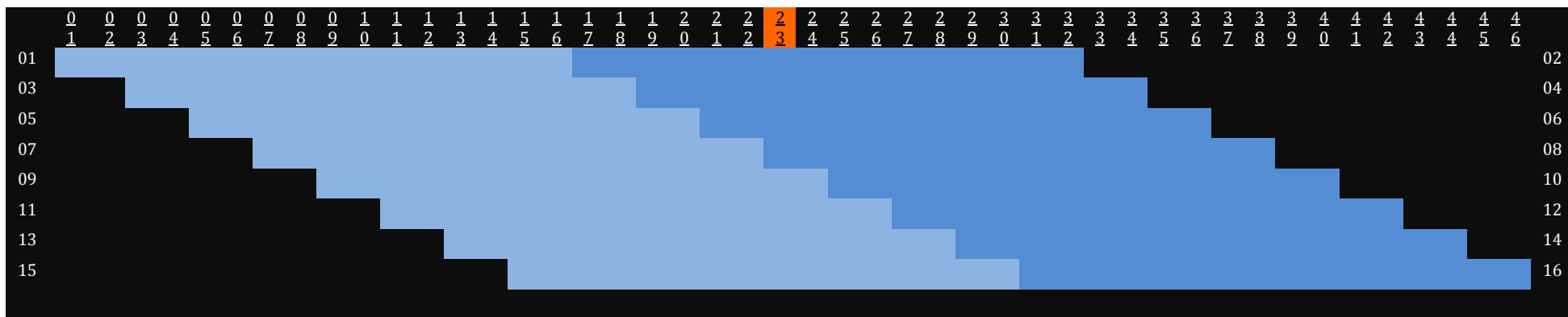


Figure 4.4.6 Map showing how the lines shift along the series of pitches through the score. Vertical axis shows the Lines – 01/02; 03/04; 05/06; 07/08 and so on. Horizontal axis shows the pitch row numbers.

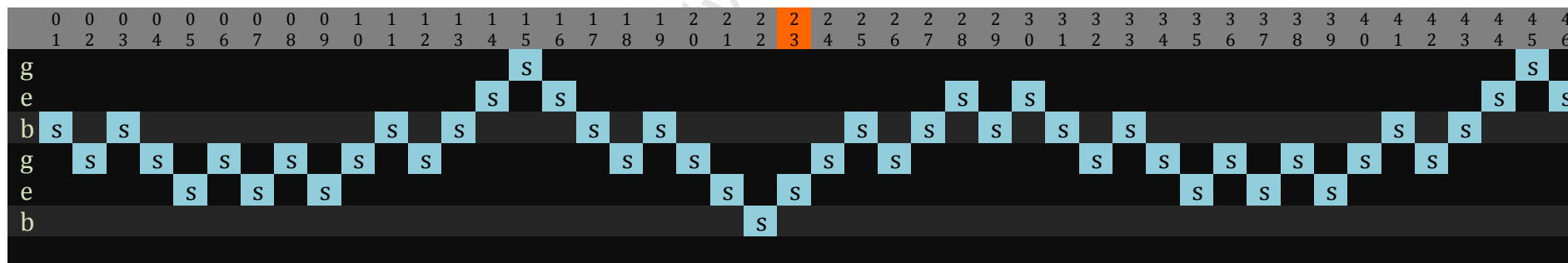


Figure 4.4.7 Pitch map of the complete Soprano pitch row of 46 pitches.

The mid point of this pattern would be note 23, which is also the number of note values per line (7,9,7). Note 23 in the pitch row is on the note E and is immediately preceded by the only place in the pitch row where the line descends to the pitch B below E. Note 23 is also the first note of the T-voice in Line 8 of the score. This is the only place in the score where there is a non-consecutive step in pitches in the T-voice from one line to the next. The step that usually follows consecutive notes of the triad, here jumps an octave from B to B. At this point in the text, the descent to the low B is set to the words “ex Maria Virgine”. Immediately preceding this at the beginning of Line 7, the words “natus est de Spiritu Sancto” are set to the only place in the score where the pitch row stays on one pitch for 3 consecutive notes – G, G, G. It can surely be no accident or coincidence that the change in pattern coincides with the words describing the incarnation of God through the Virgin Mary.

It can also be pointed out here that each line starts on the note B. This note B replaces whatever note would normally appear in the pitch row at this point. Together with the M-voices always starting on the note E, this results in a sounding at the beginning of each line of the open 5th – E to B – producing an implied “drone” on these notes throughout the piece²². At this point it is perhaps pertinent to return to Lubow’s interview with Pärt, in which Pärt, after he had ‘crashed out some loud dissonant chords, a bedlam of black and white keys’, holds down an open fifth on the piano and says: “We read it in our hearts and minds... And you can choose. The composer can choose what he needs. This is very primitive explaining, but it is so. Who can say it is not so?” (Lubow 2010, 6) Pärt speaks here not only of a conscious process of listening, but also of a subconscious process of recognition which takes place in our ‘hearts and minds’.

Returning to the ‘information encoded in mathematical rules’ – the number 46 can also be grouped in the following pattern: $39 + 7$, or $(3 \times 13) + (3+3+1)$. This pattern of numbers can also be seen in the organisation of the T-voice pitch row. As noted above, pitch number 22 is the only place in the pitch row where it falls below the fundamental E to the lower B. This would suggest some particular significance to this note, perhaps

²² Sometimes the notes following this “drone” note in the pitch row will be altered as well (e.g. Line 6 – notes 21 and 22 are both changed: from E, B to B, G), maintaining the consecutive movement of pitches.

that it is acting like some kind of pointer. If note 22 is taken as an end point in the 46 note row, then note 23, the half way point could become the starting point of a new pitch map. Following the use of circular patterns in the structure of the piece note 46 could be followed by note 1 to continue the pitch row pattern – joined to itself and with the potential to carry on repeating itself indefinitely.

As an aside here, in this act of the pitch row feeding back into itself (also present in the M-voice patterns where line 16 relates to and leads back to line 1), the score could be imagined to be laid out on a circular frame, as on a lamp-shade. As the music happens, the lampshade would turn slowly on its axis with light pouring through it from the central point. An observer at a fixed point would experience the movement of the circular frame in a continual orbit around the central point of light, much as one might observe a planet orbiting the sun. With this image the pitch map can now become a three dimensional entity, once again leading, icon-like, to dimensions beyond description with words – dimensions where celestial orbits, breathing, waves (in all their different forms) and the vibration of a single string (in this case the E string) all become one and the same thing.

In the T-voice pitch map, shifting the 'starting point' could now be seen as a process of moving the circular frame in order to view the row from a different perspective. From this new perspective, the 46 note row, which at first appeared to be something lacking obvious definition now reveals a simple and ingenious symmetry – symmetry and numerical arrangement rich in symbolism. (See Figure 4.4.8)

With the pitch row starting at note 23 a pattern is revealed which points once again to the “nucleus” at the heart of the composition – the triangle. As with the M-voice, the T-voice can be seen to have its origins in the triangle. These can be derived from two groups of notes that repeat themselves in the 46 note pitch pattern: one group of three notes, the other a group of thirteen notes. This is shown in Figure 4.4.9.



Figure 4.4.9 Pitch map of a section of the 46 note pitch row, showing two possible groupings that repeat systematically over the row: one group of three notes (green) one group of 13 notes (blue)

With a small amount of manipulation these two groups can become the same pattern of two triangles found in the M-voice: that is – one smaller triangle of three pitches, and one larger triangle of thirteen pitches as shown in Figure 4.4.10.

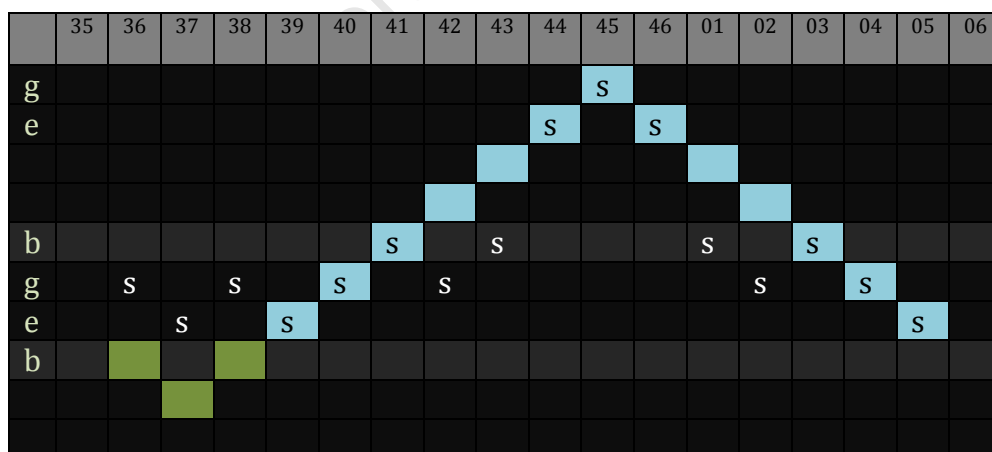


Figure 4.4.10 Pitch map of the same section of the 46 note pitch row in Fig. 4.4.10 showing a hypothetical expansion of the pitch row around the horizontal B axis to reveal the pattern of a three-point and a thirteen-point triangle.

On a practical level if the thirteen-point triangle maintained its shape in the pitch map, the range of pitches needed to sing the triangular shape would be too wide to accommodate the usual range of the soprano voice. This in itself would suggest a need to manipulate the original triangle to a more 'singable' shape. On a symbolic level, the dropping of the middle section of the thirteen-point triangle to the actual shape used (as shown in Figure 4.4.9), creates further possibilities for interpretation. With Christ at the apex, the lowering of a section of the triangle could symbolise coming down from heaven to earth, or the incarnation. Then, as in Leonardo's depiction of the Last Supper, Christ, at the apex, is flanked by two sets of three disciples on either side. Or alternatively, the adjusted triangle also produces an horizon of three hills, which could be a reference to Golgotha and the three crosses of the crucifixion.

Figure 4.4.11 shows the complete 46 note pitch map where three thirteen-point triangles are joined by two 3 point triangles and a single point, giving the numerical pattern of $13 + 3 + 13 + 3 + 13 + 1$.

What is interesting to note is the inclusion of a single point as an important component of the pattern (the lowest and last note on the pitch map). Symbolically, it could be that this single point is the "gesture" from which the triangle itself emanates, and ultimately returns to.

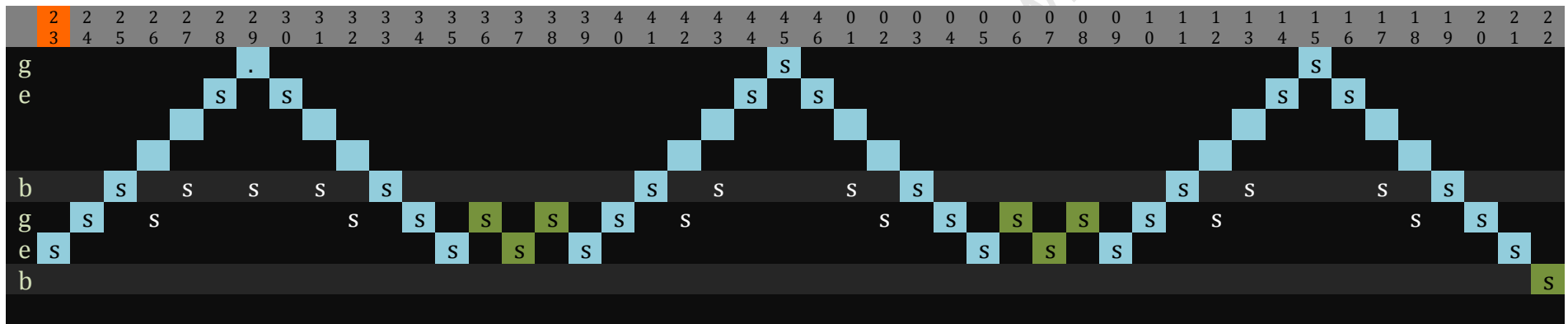


Figure 4.4.11 Pitch map showing a hypothetical expansion of the pitch row reveal the pattern of three 13 point triangles joined by two 3 point triangles and a single point, giving the numerical pattern of $13 + 3 + 13 + 3 + 13 + 1$.

To play with these numbers further, they could be organised thus:

$$13 + 3 + 13 + 3 + 13 + 1 = 46$$

$$4+6 = 10$$

$$1+0 = 1$$

or

$$1+3+3+1+3+3+1+3+1 = 19$$

$$1+9 = 10$$

$$1+0 = 1$$

So in terms of this numerical arrangement, the entire pattern can be distilled to the number 1. This could be reminiscent of the tintinnabuli sum where $1 + 1 = 1$.

It is entirely possible that these last observations are the subjective imaginings of an over-zealous analyst. It could also be that the creation of a very sound structure of proportions and 'information encoded in mathematical rules' provides the basis from which it is possible to have the freedom to 'see' the music from the unique perspective of whoever is looking at it.

So far the pitch maps have only looked at the soprano voice. Examination of the Tenor, the other T-voice, shows the same principles of construction in operation. If the voices are placed in the same grid following the numbers of the 46 note pitch row the Tenor voice can be seen to be an inversion of the Soprano voice.

(This is shown in Figure 4.4.12)

Two important concepts arise from this presentation of pitch maps that refer again to the concept of 'linking the head with the heart'. Firstly, the music is clearly based on a highly structured organising principle; and second, there can be deviation from this organising principle. Deviations from the structure are both regular and irregular.

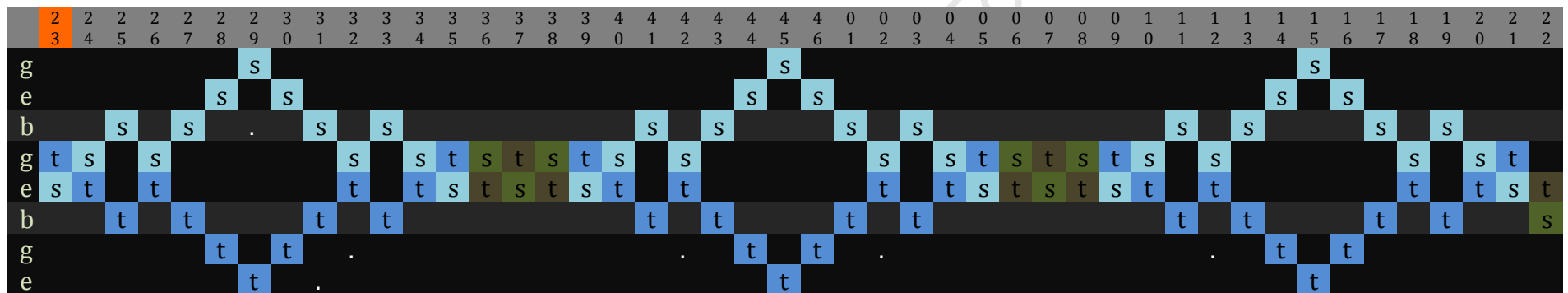


Figure 4.4.12 Pitch map showing soprano and tenor voices over the 46 note pitch row. Symmetry occurs around note 45 and in 3 interlocking displaced triangles joined by 2 smaller interlocking triangle links . White dots indicate actual written pitches that deviate from the set pattern.

4.5 Some deviations from the pattern

Irregular deviations are like the repeated pitch referred to in Line 7 on the words “...natus est de...”. This alteration to the set pattern where the pitch G is repeated on consecutive syllables occurs only at this place in the music.

Regular deviations from the set pattern occur in both the Soprano and Tenor voices. The first regular deviation is placing the first note of each line on the pitch B regardless of its position in the pitch row, thus maintaining the drone effect on B. Further, in the Soprano, note 29 is written as a B in place of the expected E at the apex of the triangle. In the Tenor the expected pattern is interrupted at notes 2, 12, 21, 22, 32 and 42. This is shown in Figure 4.4.12 where scored notes that deviate from the pattern are represented by white dots. (The reasons for these deviations from the structural pattern could be the subject of further investigation.)

Using systems to create music is not something new to the world of musical composition. Guido d'Arezzo developed a system for notating pitch. Early music composers used the formal structures of canons, palindromes and isorhythms in their polyphonic music. From here, through the development of human culture, systems became more complex and multi-layered. The very existence of musical analysis would imply that all music is based upon a structure that can be analysed. Assuming then that structure always exists in music, what is important with creating music is how the composer chooses a structure and then interacts with the structure. In Pärt's words:

There are definite rules everywhere – it has to be so. But my principle is that they must not be the most important part of the music. They must be simple – they fall away like only a skeleton. Life arises from other things. When things are simple and clear, then they are also clean. They are empty: there is room for everything. It is more important than these principles of construction. (McCarthy 1989, 133)

Deviations from the structure in *Summa* demonstrate both the importance of structure in providing a skeleton, and the importance of a human element to provide life and character to the skeleton.

Reviewing the Symposium entitled “Regulation of Creative Processes in Music” held in Berlin, Germany in July 1996, Richard Parncutt recounts how Pärt described, in an open discussion, his compositional procedure for the *Kyrie Eleison* of the *Berliner Messe*. The procedure was described as involving two main levels of “regulation”:

... first, the determination of a compositional algorithm, and second, the subjective appraisal of musical materials generated by the algorithm. In this paradigm, any failure of the generated musical material to meet the composer's intuitive aesthetic criteria is likely to provoke a revision of the compositional algorithm. Depending on the severity of the problem, the revision could be anything from slightly tweaking the algorithm to starting over from scratch. (Parncutt 1997, 68)

Without fully exploring the possibilities of fractal composition, and algorithmic composition here, their existence as methods with which Pärt is familiar needs to be acknowledged. As a brief example, Figure 4.4.13 shows how the triangle could have been used as a generating nucleus for the Soprano pitch row.

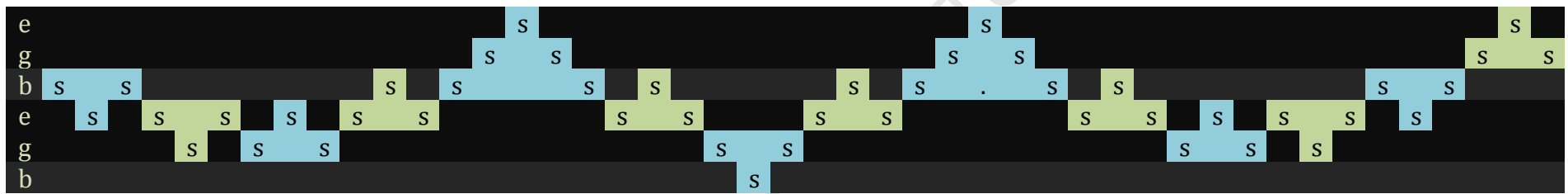


Figure 4.4.13 Pitch map showing the Soprano voice as a result of a generative process, like fractal composition that uses the triangle as a generating nucleus

In drawing up pitch maps for the different voices in *Summa* it can be seen that both objective and subjective procedures are used in the composition process – the setting of ‘the compositional algorithm’, the creation of a proportionally governed structure and the tweaking of the system to satisfy the composer’s intuitive aesthetic criteria.

It is now possible to construct a full pitch map of *Summa* for all voices, as an extended summary of the process of pitch mapping.

4.6 Full Score pitch maps

In his tintinnabuli laboratory, Pärt examines the ancient tonal elementary cells and out of these, he creates fascinating new organisms. The internal structure of these works may not only be of interest for musicologists. Pärt has managed to break through to the ancient geometry, which is austere and simple, but also highly complicated at the same time. (Kareda 2010, 1)

Saale Kareda has identified the core of the ‘enigma’ of Pärt’s music. In the tintinnabuli laboratory, something like an alchemical process takes place with geometry that is simple and highly complicated at the same time – a geometry that is conscious of operating in different dimensions. Using pitch maps, a possible creative journey will be presented of the development of *Summa* from the original nucleus to its manifestation as a full score. In this journey, like following footsteps in the snow, one can place one’s feet in the impressions in the snow, but one cannot necessarily say why they move left or right, or why they necessarily follow a particular direction at all. But there can be great enjoyment in following the path, and discovering as much as one can along the way.

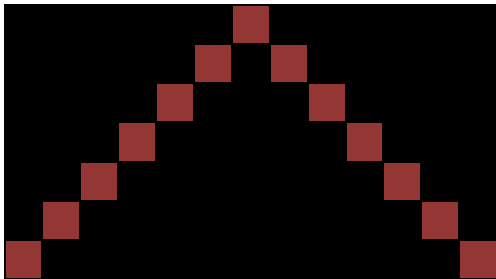
A point of sound could be taken as the starting point for the whole composition.



From here, if this one point were to become three – to reflect the ‘three in one’ of the Trinity – then the first triangle is born. Each point of the triangle comes to represent a pitch. For the M voices, the pitches are the consecutive notes of an E natural minor scale. For the T voices the pitches are the consecutive notes of the E minor triad.

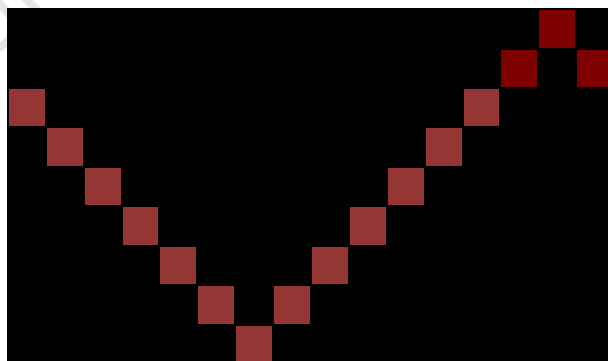


Within the context of the text of the Latin *Credo*, this ‘three in one’ triangle could represent the manifestation of God in Heaven, in whose image the earthly manifestation of God incarnate could appear symbolically as a thirteen point triangle, representing Christ on Earth with the twelve disciples.

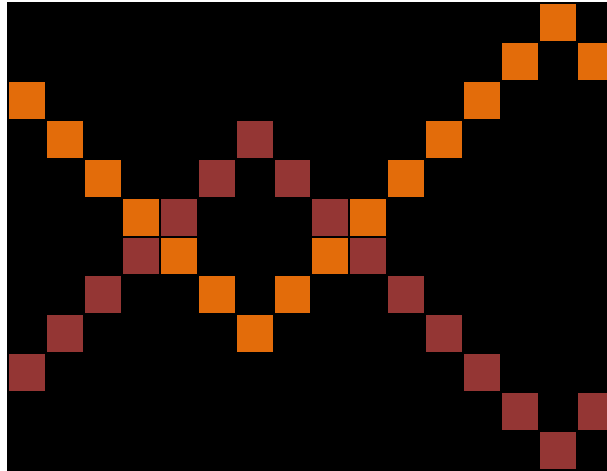


These two triangles can be combined in different ways.

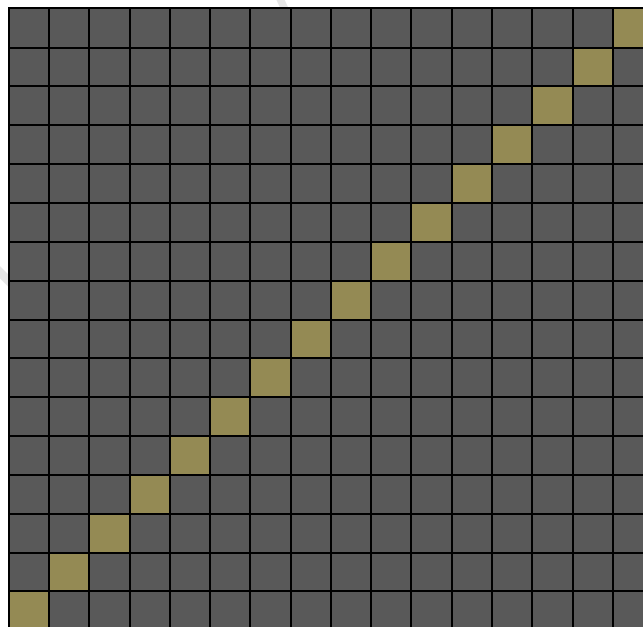
For the M-voices they are linked together to become one pitch row of 16 (13 + 3) pitches with one triangle pointing up and one down.



For two voices, the added voice can be inverted.

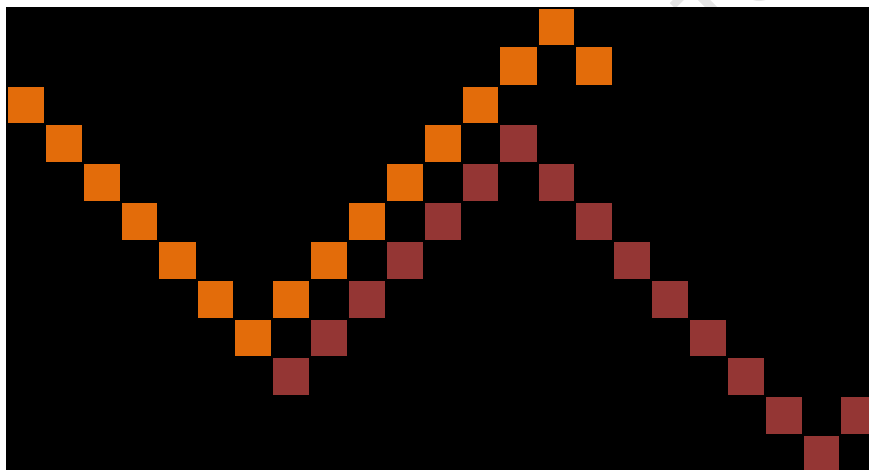


Using the 16 point pitch row as a generative unit, this row can be transformed one note at a time, where each note moves one note to the left, and the note which falls off the end of the row rejoins at the other end. This process will take 16 lines to complete, resulting in the shape of a 16 x 16 square where the end point in line 1 becomes the starting point of line 16, tracing a diagonal as it moves across the square, and in this way dividing the square into two equal triangles.

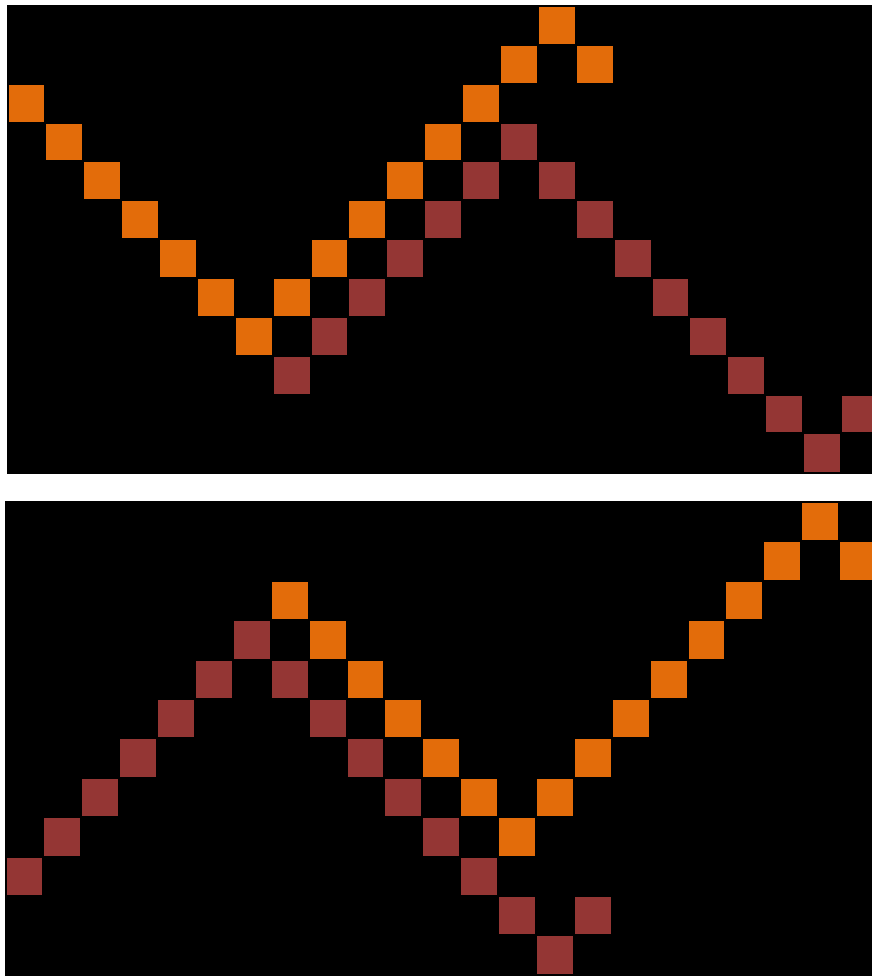


From here it is possible to start working with the text. The text can be seen numerically – as a number of syllables, rather than a language system where individual words have specific meaning. The number of syllables in the text is 364. The number which most closely fits this number over 16 rows is 23 ($16 \times 23 = 368$), which means that is necessary to extend the number of pitches in the pitch row to 23, and at some stage to add 4 pitches to unassigned syllables. The syllable problem is easily solved by extending the ‘A-men’ at the end of the piece, with four pitches given to the ‘A-’ and an extra pitch assigned to ‘-men’, used as an end point to the geometric pattern and structure.

To arrive at 16 pitch rows with 23 pitches in each, rather than alter the two symbolic triangles, it is possible to displace the two pitch rows by 7 units ($7 + 16 = 23$), resulting in an overlap of 9 units with 7 on each side.



With this extended row, one can change the order of entry of the voices and place one staff system on top of the other, resulting in further development of the triangles. The triangles now generate more triangles and patterns – arrows pointing in the direction the music is flowing, and wave patterns, and maybe even a geometric suggestion of a fish.



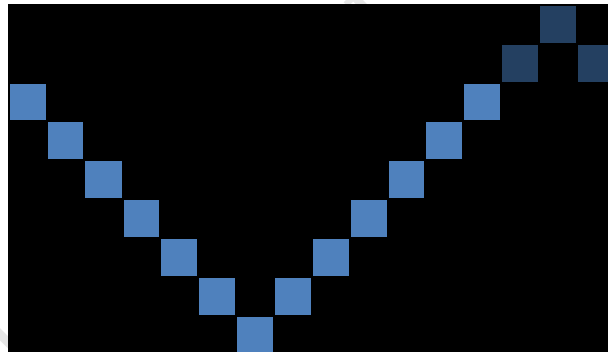
As the 16 point pitch row pattern repeats and is transformed over 16 lines and returns to its original form (with added dimensions from the displacement of the two pitch rows), a cycle is set up, which could continue without interruption indefinitely.

Out of a single point, the triangle is generated which becomes a symbol portraying Divine geometry. From the triangle a square is generated, and also a circle. The square is not visible in the music, but can be shown to exist. The circle operates in a dimension not 'representable' on a two-dimensional page of music, but it can also nevertheless be known to exist. In this way, the geometric structure of *Summa* becomes a perfect

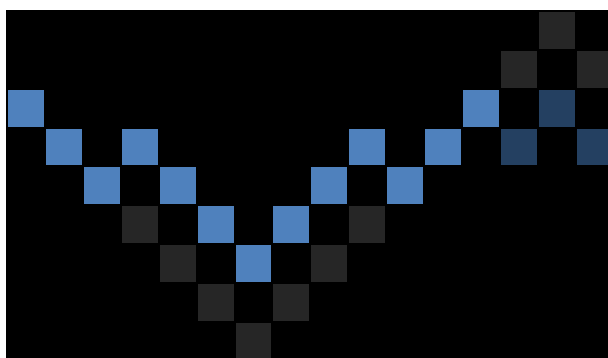
representation of knowledge and experience of the existence of God – the core statement of belief in the text of the *Credo*.

Through structure, the text is stripped of any hierarchical significance afforded to each syllable, rendering it to some extent meaningless. However, the very meaning of the text is presented in a powerful manner, inside the structure within which it operates. In the same way, the composer, having formulated the structure, is now stripped of his ego in the compositional process, and the exact positioning of notes becomes predetermined by the structure. However, within this structure it is still possible to ‘humanise’ the creative process, which Pärt does, for example, by altering the pitch structure to set up the drone around E and B, and to highlight various aspects of the text. Both the text and the composer himself become liberated from any degree of self-importance, leaving both the text and the music to focus solely on a representation of the Divine.

In the T voices the same two triangles are developed in a different way.



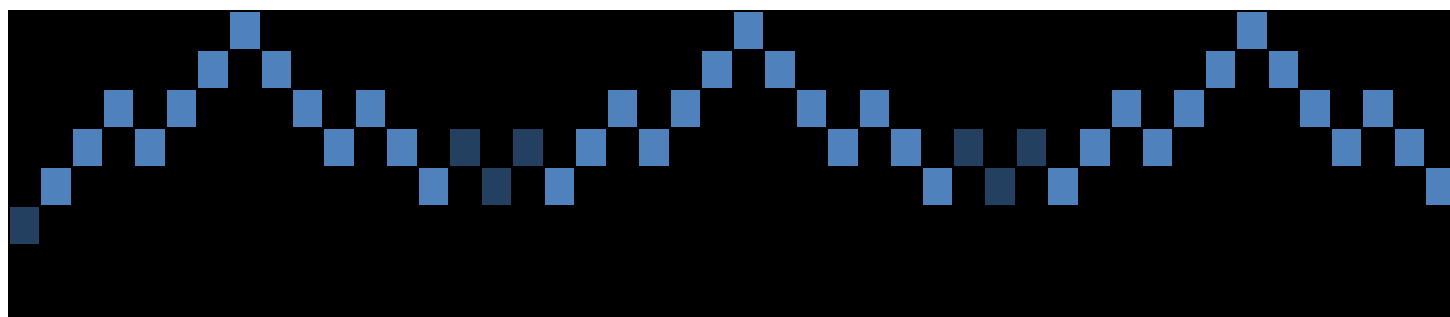
The first issue that needs to be dealt with is that if each pitch represents the consecutive notes of the triad, the pitch range of the entire row would be too wide to be sung comfortably by a single voice part. The obvious remedy is to bring the extremities in, altering the pattern, but maintaining its construction nucleus as the triangle. In this process, the shapes can take on and represent new symbolic meanings.



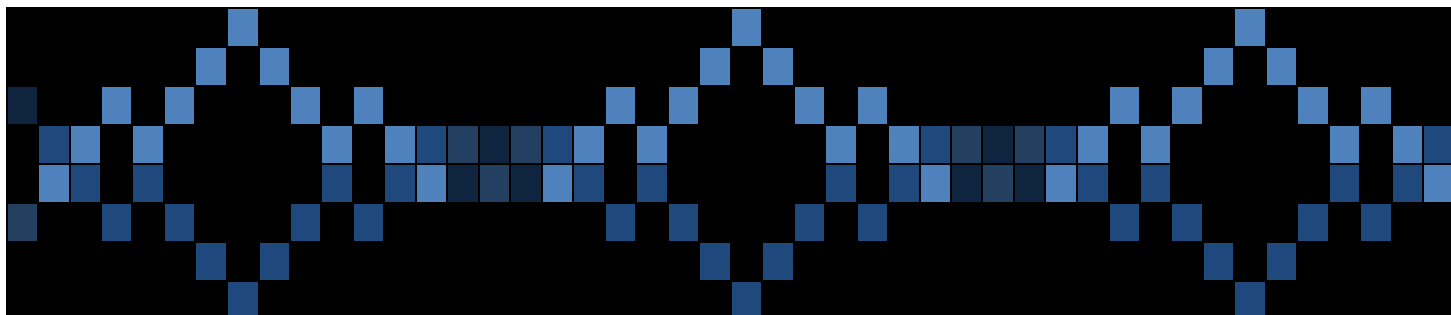
Given the harmonic stability of tintinnabuli music, the structural geometry of the M and T voices can be developed independently. The T voice does not need to follow the M voice exactly. So there is freedom for the two voices to have their own structures to operate within, while at the same time combining to form a single musical line. $1 + 1 = 1$. Whereas the M voice operates in a structure of 16×16 , extended to 23×16 to accommodate the syllables of the text, the T voice operates in a structure of 46×8 [or $(2 \times 23) \times (1/2 \times 16)$]. In terms of the 8 page layout of the score, where the M voice goes through two cycles per page, the T voice would go through one. The numbers 13 and 3 (of the triangles) can be multiplied by 3 to reach 48 – which is 2 more than 46. These two extra points can be taken away from one of the smaller triangles to leave a single point. This single point could then refer back to the starting point of the generative process. The number pattern becomes:

$$1 + 13 + 3 + 13 + 3 + 13$$

and can be represented on a pitch map:



Adding a second voice in inversion would look like this:



Once again triangles and the number 3 form a prominent element of the design of the T voice pattern. In a new way, the end of the pattern can be joined to the beginning of the pattern to create again a cyclical pattern, which operates on a different dimension to that which is seen in the music. It also operates differently to the cycle developed for the M voices.

Having established this 46 pitch pattern, it now needs to be applied to the score. As the T voices and M voices work together, the T voice pattern would need to fit over sections of 16 pitches to correspond to pattern in the M voices. As already discussed 16 does not multiply exactly into 46, so, clearly, a new system needs to operate in order to fulfill the realisation of this pattern.

What Pärt does here is to use a “snapshot” technique.²³ Taking a “snapshot” of the first 32 notes in the 46 note T voice pattern, these pitches are assigned to 2 lines of 16 notes in page 1 of the score. For the next page the “snapshot” is moved along two notes, from note 3 to note 34. Continuing in this manner, two notes are added on each new page of the score to the original 32 notes of page 1 – that is 2 notes x 7 additional pages = 14 notes in total added to 32 notes, which fulfills the 46 note T voice pattern (32 + 14 = 46).

²³ Could this be a reference to, or perhaps similar to the ‘snapshot technique’ developed and named by fellow Estonian composer, Jaan Rääts (1930 -)?

Using this geometrical pattern, Pärt then develops the music into a score to be played by musicians. Syllables are added to the pitch rows along with additional compositional features. Note duration is another important aspect of the compositional process, which is constructed around its own particular pattern. Within this pattern, Pärt also uses slurred notes. These notes are applied to the pitch rows using notes from the T voice triad, and provide additional texture to the sound of the music. It is quite probable that they follow their own divine geometry, which could be the topic of further research.

Figure 4.5.1 presents the first page of the score of *Summa*. This is followed by the full pitch map of the first page of the score of *Summa* in Figure 4.5.2.²⁴

summa arvo pärt

1

S. Cre-do in u-num De-um, Pa-trem om-ni-po-ten-tem, fac-to

A. Cre-do in u-num De-um, Pa-trem om-ni-po-ten-tem, fac-to

T. Pa-trem om-ni-po-ten-tem, fac-to - rem coe-li et ter-rae, vi-

B. Pa-trem om-ni-po-ten-tem, fac-to - rem coe-li et ter-rae, vi-

2

S. et in-vi-si-bi-li-um. Et in u-num Do-mi-num Je-sum

A. et in-vi-si-bi-li-um. Et in u-num Do-mi-num Je-sum

T. si-bi-li-um, om-ni-um, et in-vi-si-bi-li-um. Et in

B. si-bi-li-um, om-ni-um, et in-vi-si-bi-li-um. Et in

Figure 4.5.1 First page of the score of *Summa*

²⁴ For interest, the note durations and slurred notes are added to the full score pitch map.

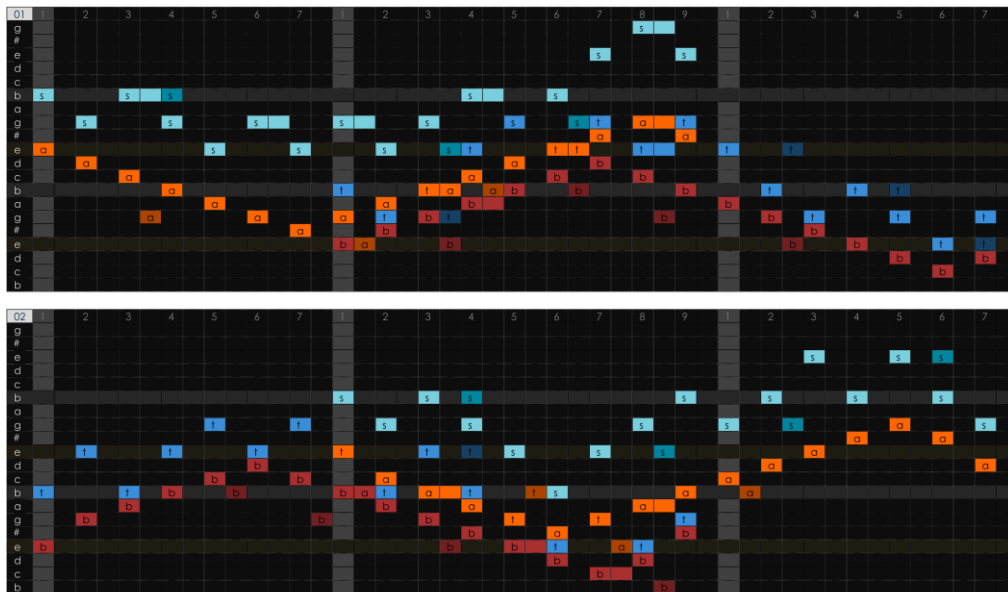
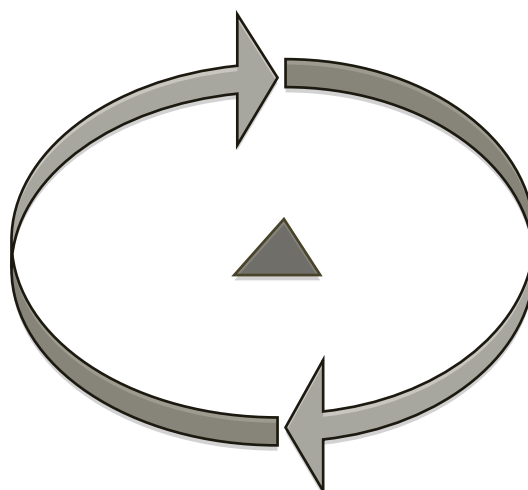


Figure 4.5.2 Pitch map of the first page of the score of *Summa*

This same image can again act as a single frame from an eight frame animated movie. (See Addendum DVD – Full Score SATB) The moving picture acts as a further dimension to the score, which ordinarily can be neither seen nor heard, but nevertheless exists and can be demonstrated. In another dimension, the divine geometry of the universe is presented. Like a rotating screen, the score can go round and round, illuminated by a central light source – in the same way that a child might ride on his bicycle, round and round a telephone pole transmitting music on a deserted market square.



Conclusion

Analysis of *Summa* reveals a creative process of 'linking the head with the heart'. Divine proportions are presented in mathematical formulas and geometric shapes, and then humanised with creative intuition. From the "gesture" of a single note a triangle is created. As in a process of fractal composition, the triangle is used as a building block to formulate the structure of pitch rows in both the M and T voices. Pärt has taken the 'spirit' of early music and combined it with contemporary compositional techniques to create new music that is both ancient and modern. This music is imbued with a deep sense of spirit, and is consciously constructed with an understanding of principles of patterns that reflect the divine geometry of the Universe.

In Pärt's music religious praxis and compositional practice embrace each other. In both there is the sublimation of the ego through the celebration of structure. Within structure there is space to breathe, to vibrate in harmony with the vibrations of the Universe. In this space, creative intuition becomes a process of recording what naturally exists, visible and invisible, and that can be seen or perceived through a meditative 'cloud of unknowing'. In the unknowable process of creating sound there is a just and delicate and robust alignment of vibrations – as delicate and colossal as the movement of the planets around the sun, as microscopic and forceful as the vibration of the smallest string-like energetic units of matter. Ultimately, everything returns to a single vibration.

In *Summa*, the music breathes in a representation of a life force, where opposites are united like image and reflection in a mirror – where $1 + 1 = 1$. High voices and low voices are one. Female and male are one. What ascends, also descends and returns to its base. The music moves backwards and forwards at the same time, up and down at the same time, expands and contracts and passes seamlessly from one voice to another. The music can be performed with vocalists or with instrumentalists. The words, like the notes of the music, are not as important in themselves as the un-writable messages and symbolism carried in the energy of their meaning. Even for the words, their "ego" has been removed, so that through the music one can focus on an experience of the sacred geometry of the Universe.

The music can be seen as a bridge – between people, between peoples, over countries, over seas, over dimensions, between the head and the heart, between the body and the spirit, between the sacred and the profane, between God and humankind. Music created in this way is more than that which meets the ear or the eye. It embodies the qualities of an icon, a vision and a revelation. It guides the perceptions of a listener through an invisible window that it opens so that they might become aware of the existence of an otherwise invisible divinity. It provides an aural and visible representation of a mysterious Creator. It reveals and reflects the order and intuitive creativity of the Universe in its own design.

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BIBLIOGRAPHY

Agawu, Kofi. 1997: "Analyzing Music under the New Musicological Regime." *The Journal of Musicology*, 15(3), 297-307.

Anderson, Martin. 2000: "We Should Know Who We Are': Veljo Tormis in Conversation." *Tempo* (New Series), 211, 24-27.

Bostonia, Marguerite. 2009: "Musical, Cultural, and Performance Structures in the Organ Works of Arvo Pärt." Doctoral Research Project, West Virginia University.

Brachert, Thomas. 1971: "A Musical Canon of Proportion in Leonardo da Vinci's Last Supper." *The Art Bulletin*, 53(4), 461-466.

Bridges of Song Festival Songbook Chapel Hill, NC: Hinshaw, 1990

Bujić, Bojan. 1973: "Josquin, Leonardo, and the "Scala Peccatorum."" *International Review of the Aesthetics and Sociology of Music*, 4(2), 145-163.

Clarke, David. 1993: "Parting Glances: David Clarke Reappraises the Music and the Aesthetics of Arvo Pärt." *The Musical Times*, 134(1810), 680-684.

Cook, Nicholas. 1987: "Musical Form and the Listener." *The Journal of Aesthetics and Art Criticism*, 46(1), 23-29.

Daitz, Mimi S. 1995: "Reflections on "Reflections": The Music and the Cultural/Political Context of Two Choral Works by Veljo Tormis." *The Musical Quarterly* 79(1), 108-130.

Duckworth, William. 1999: *20/20: 20 New Sounds of the 20th Century*, Wadsworth Publishing Co.

Eagle, Charles T. 2001: "A Letter: Musical Harmonics Reveal Reality." *Journal of Music Science*, 1(1), <http://www.uniware.com/JournalScience/Article2/pages/2.htm>

Hillier, Paul. 1997: *Arvo Pärt*. Oxford: Oxford University Press.

Isacoff, Stuart. 2002: *Temperament – How Music became a Battleground for the Great Minds of Western Civilization*, London: Faber and Faber.

Kareda, Saale. 2010: "The Complex Austere Simplicity of the Tintinnabuli Style by Arvo Pärt." Conference Paper: *Arvo Pärt: Soundtrack of an Age*, Royal Festival Hall, London, September 24-25 (unpublished, received from the author).

Lippus, Urve. 1996: "Structures and Symbols in Tormis's Music: An Introduction to the Estonian Ballads." *Musical Semiotics in Growth* ed. Eero Tarasti, Indiana University Press.

Lubow, Arthur. 2010: "The Sound of Spirit." *New York Times Magazine*, October 17, 2010: <http://www.nytimes.com/2010/10/17/magazine/17part-t.html?pagewanted=1>

McCarthy, Jamie. 1989: "An Interview with Arvo Pärt." *The Musical Times* 130(1753), 130-133.

Nattiez, Jean-Jacques. 1990: *Music and Discourse: Toward a Semiology of Music*, Princeton University Press.

Pandey, Ashish. 2005: "Klang." *Encyclopaedic Dictionary of Music, Volume 2* ed. Ashish Pandey, Chaula Offset Press, Delhi, 381.

Parncutt, Richard. 1997: "Review: Regulation of Creative Processes in Music." *Computer Music Journal*, 21(1), 68-69.

Sander, Kurt. 2010: e-mail correspondence, 16/09. Associate Professor of Music Theory & Composition, North Kentucky University.

Smith, Geoff. 1999: "Sources of Invention: An Interview with Arvo Pärt." *The Musical Times* 140(1868), 19-25.

Strauss, Tinus. 2008: "A Burden of Wonder" *Colloquium and Festschrift at the Occasion of the 60th Birthday of Derrick Kourie (Computer Science)*, University of Pretoria, <http://www.cs.up.ac.za/cs/sgruner/Festschrift/>

Walker, D.P. 1967: "Kepler's Celestial Music." *Journal of the Warburg and Courtauld Institutes*, 30, 228-250.

Wolverton, Vance D. 1998: "Breaking the Silence: Choral Music of the Baltic Republics, Part One — Estonia." *Choral Journal*, 38(7), 21-28.

Websites:

12 Different Contemporary Approaches to Music Analysis for Course Music 839B
Instructor: [Dr. David Huron](#), Ohio State University School of Music, 2004.
<http://www.musiccog.ohio-state.edu/Music839B/index.html> Accessed: 08 April 2009, 3:07pm

Arvo Pärt and Contemporary Spirituality Conference, Boston University School of Theology, 25-27 March 2010.
<http://www.bu.edu/apcsc/papersabstracts/> Accessed: 02 May 2010, 3:52pm

Arvo Pärt: Soundtrack of an Age, South Bank Centre, London, 24-25 September 2010
<http://www.southbankcentre.co.uk/sites/default/files/Arvo-Part-Soundtrack-of-an-Age-schedule.pdf> Accessed: 30 September 2010, 3:24pm

The Cultural Roots of Arvo Pärt's music, Estonian Graduate School of Culture Studies and Arts (GSCSA), Estonian Academy of Music and Theatre, Tallinn, 15-17 October 2010.
<http://www.ema.edu.ee/ktkdk/?s=170> Accessed: 30 January 2011, 10:11pm

Estonian Music Information Centre
<http://www.emic.ee> Accessed: 01 September 2010, 7:54pm

Estonian Music Review No 7, Published by the Estonian Music Council, [ISSN: 1406-9490]
http://www.emic.ee/failid/File/Music%20in%20Estonia%20No_%207.pdf Accessed: 21 June 2011, 6:05pm

Estonian Singing Revolution
<http://www.tallinn-life.com/tallinn/estonian-singing-revolution> Accessed: 14 May 2011, 02:05pm

Galina Grigorjeva – Prayer
<http://www.youtube.com/watch?v=amr9cRn6D8U> Accessed: 09 June 2011, 09:25am

International Arvo Pärt Centre
<http://www.arvopart.ee/> 29 January 2011, 09:39pm

Lepo Sumera – Quasi Improvisatura
http://www.youtube.com/watch?v=lj6_MfACPnc&feature=related Accessed: 09 June 2011, 09:40am

"Mu isamaa on minu arm" Estonian Song Celebration – 2009
<http://www.youtube.com/watch?v=34mYlYkzPVU> Accessed: 14 May 2011, 02:17pm

Rotas square
http://orderofcenturions.org/documents/rotas_square.html Accessed: 24 March 2010, 03:33pm

St John of Damascus
<http://www.newadvent.org/cathen/08459b.htm> Accessed: 15 August 2010, 05:15pm

Thomas Aquinas - Summa Theologica
<http://www.ccel.org/ccel/aquinas/summa.html> Accessed: 15 August 2010: 06:01pm

CDs:

De Profundis, The Theatre of Voices, Paul Hillier, Harmonia Mundi, [HM7182], 1996.

Pärt: Choral Music, 2CD Boxset, Various artists, Virgin Classics [724356243422], 2004. Notes by Adélaïde de Place (tr. Hugh Graham).

Baltic Voices 2, Estonian Philharmonic Chamber Choir, Harmonia Mundi, [907331], 2004. Liner notes and text by Galina Grigorjeva, Paul Hillier, Per Nórsgård, Toivo Tulev (tr. Elsa Beaulieu and Heidi Fritz).

John Tavener: The Protecting Veil, Steven Isserlis, Virgin Classics [59052], 1992.

Giacinto Scelsi: *Natura Renovatur*, 1. Klangforum Wien, Kairos, 2001. ASIN: B000059PVB. 2. Münchener Kammerorchester, ECM Records, 2006 ASIN: B000FBIYBG.

Canticles of Ecstasy, Sequentia, Benjamin Bagby, Deutsche Harmonia Mundi / BMG Classics (05472773202) in co-production with WDR Köln, 1994.

DVD:

Arvo Pärt: 24 Preludes for a Fugue written, directed and filmed by Dorian Supin; produced by Idéale Audience International [DVD9DS09], 2002.

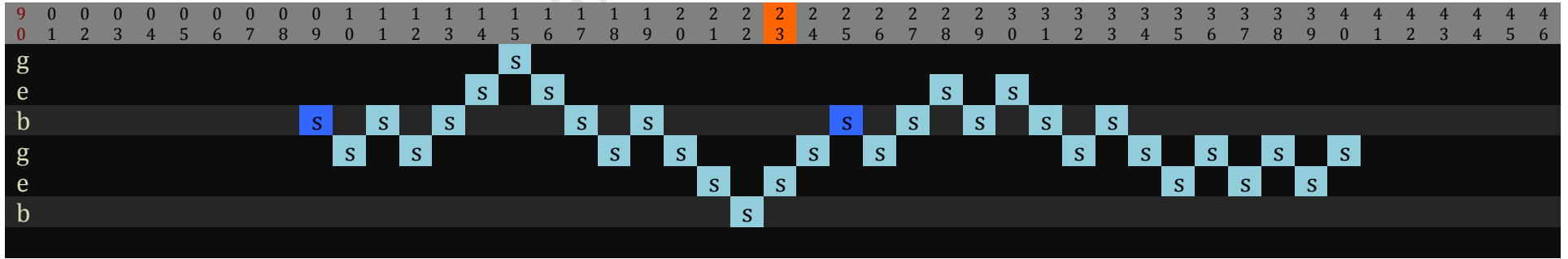
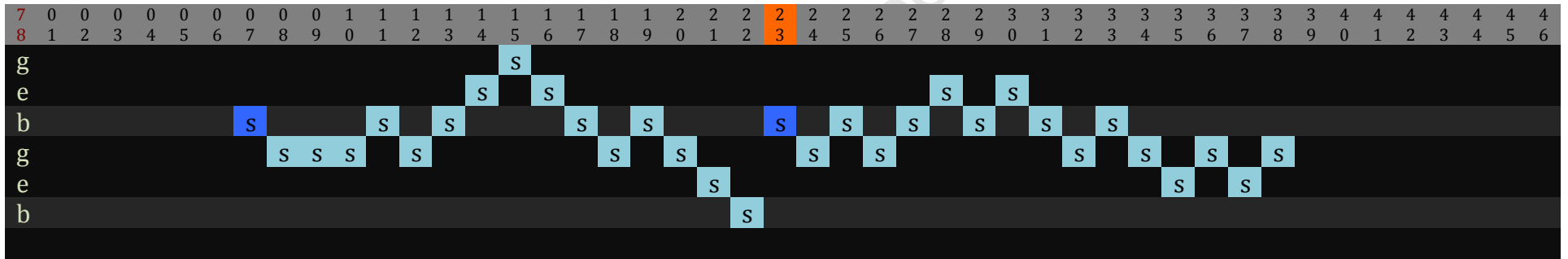
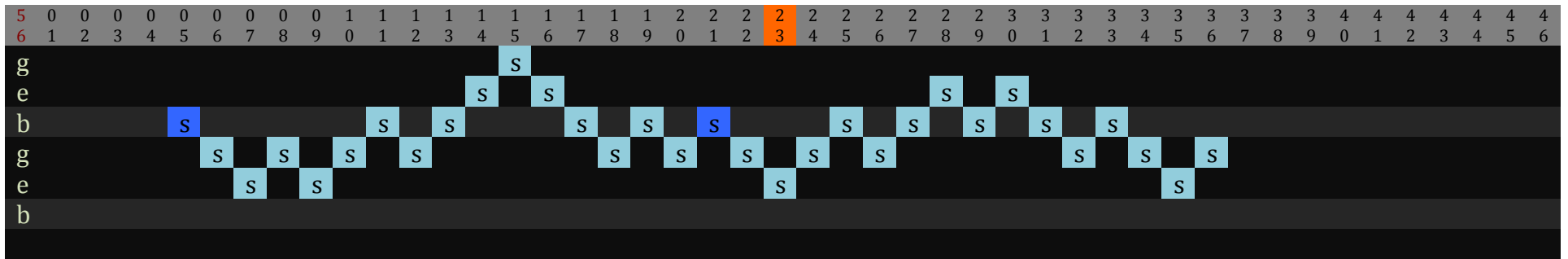
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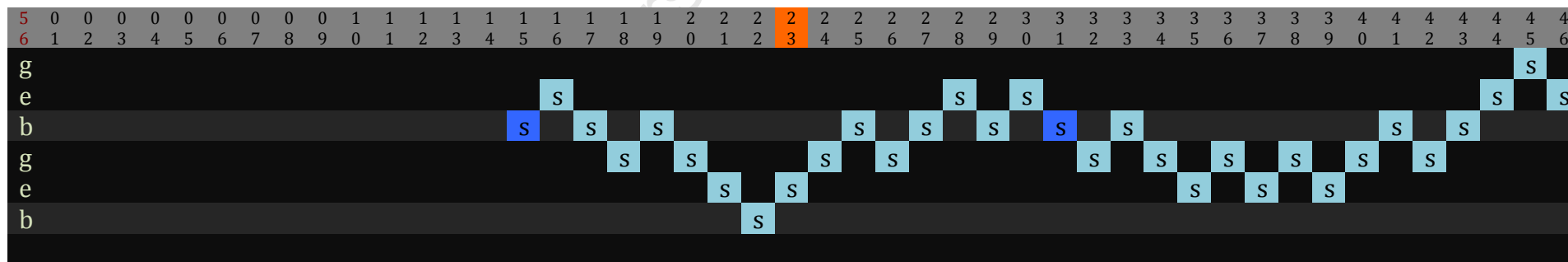
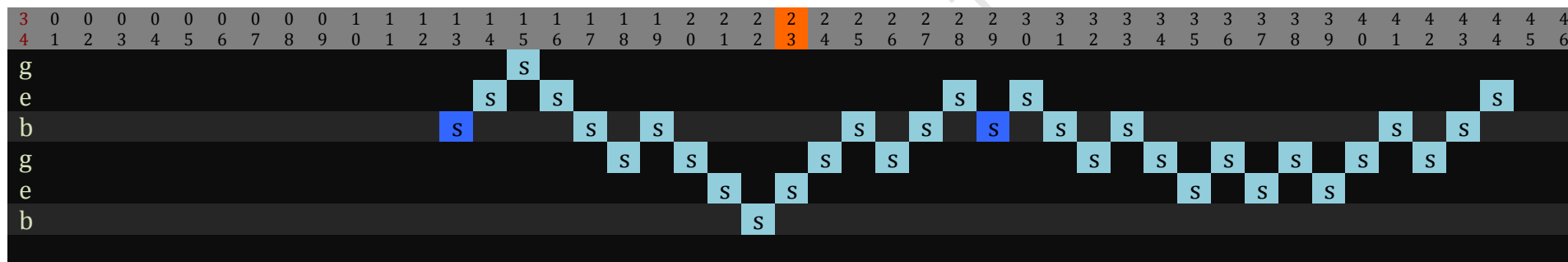
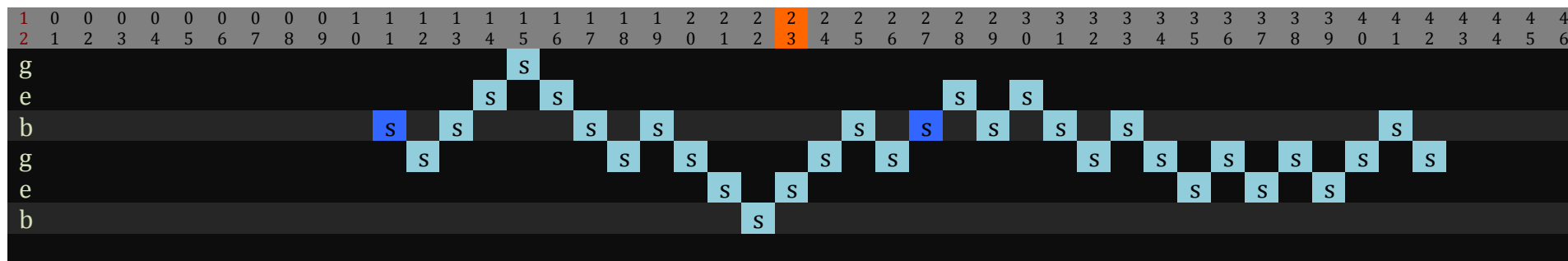
ARVO PÄRT, Collected Choral Works, Complete Scores, Universal Edition, 1999.

Spiegel im Spiegel, für Violoncello und Klavier, Universal Edition, ue30336, 1978.

PÄRT, Cantus in Memory of Benjamin Britten, für Streichorchester und eine Glocke, Philharmonia PH555, Universal Edition, 1980

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Grid series showing the movement of pitches in each line of the score for the Soprano voice

Addendum DVD – *Summa* – Moving Pitch Maps

Contents:

1. *Summa* - AB16
2. *Summa* - AB23
3. *Summa* - ST23
4. *Summa* - ST46
5. *Summa* - Full Score

6. *Spiegel im Spiegel* - Piano

Soundtracks for each chapter are a reconstruction of the music appropriate to the given pitch map.