Australia’s microtonal modernist: The life and works of Elsie Hamilton (1880-1965)

Talisha Goh

Edith Cowan University

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Australia’s Microtonal Modernist:
The Life and Works of
Elsie Hamilton (1880-1965)

Talisha Goh
Western Australian Academy of Performing Arts
Edith Cowan University

This dissertation is submitted for the degree of Bachelor of Music Honours
2014
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Abstract

This dissertation represents the most complete account to date of the life and works of Australian composer Elsie Hamilton (1880-1965). Through examining the theories of the Anthroposophical movement, I demonstrate how her music feeds from this belief system, and also demonstrate how Hamilton’s stance is congruent with the modernists of her generation. In addition, I position Hamilton’s modal system within the complex mathematics of Greek musical theory (as conceived by her collaborator, Kathleen Schlessinger). Finally, I provide modern editions and electronically manipulated sound files to all of Hamilton’s surviving compositions. Elsie Hamilton’s story is fascinating. This dissertation welcomes her into the canon of music history.
Acknowledgments

I would like to thank my wonderful supervisor, Stewart Smith, for welcoming me so warmly into WAAPA this year and for his encouragement and advice throughout.

I wish to thank my mother for her constant support and patience.

As always, this thesis is dedicated to my late father who shared and nurtured my love for learning and passion for music.
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Introduction

This dissertation centres round the remarkable life and music of Elsie Hamilton (1880-1965). A true original, and a without question a musical adventurer and a pioneer, Hamilton’s early twentieth-century microtonal music was misconstrued during her lifetime and has been neglected ever since. She is missing from the standard music histories and the standard biographical dictionaries, and there is almost no reference to Hamilton or her music in the secondary literature. Recently, the Australian musicologist Kate Bowan published a study focusing on Hamilton’s collaboration with her friend Kathleen Schlesinger. And along with information from a particularly informative website, this is practically the sum total of the secondary literature dealing with Hamilton and her music. This dissertation, therefore, is pioneering too. Building upon the groundwork laid by Bowan, I take a closer look at Hamilton’s life, and explain her music by recourse to her Anthroposophical beliefs. In doing so, I position Hamilton as a forgotten and important Australian modernist.

The dissertation is divided into three chapters, and is preceded and followed by an introduction and conclusion. Chapter One utilises significant new primary sources—in particular archived newspaper articles—and offers the most complete biography of Hamilton to date. Hamilton’s early life is captured, as are her interactions with the

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3 A new-age religious movement that Hamilton became involved in and significantly affected her and Schlesinger’s musical philosophies and works.

Anthroposophical movement, her collaborations with Schlesinger, and other
musicians and her interactions with contemporary occultists. Woven into this
narrative are several new accounts of the performances of her works. Following this
biography is a succinct contextualizing history of the Anthroposophical movement and
the importance of music within their belief system. And through examination of a
series of lectures Rudolf Steiner gave on music between 1902 and 1923, I attempt to
capture something of the excitement of the society’s intellectual programme. I
conclude Chapter One positioning Hamilton as an Australian modernist.

Chapter Two of this dissertation attempts to explain the complicated musical tuning
system that lies at the heart of Hamilton’s works. Kathleen Schlesinger’s *The Greek
Aulos* and Maria Renold’s *Intervals, Scales, Tones and the Concert Pitch C=128Hz*
have been invaluable in this study. Chapter Three focuses on Hamilton’s surviving music. Modern editions of all of her
surviving music are presented alongside a series of computer-enhanced recordings.
This dissertation offers the most comprehensive treatment of Elsie Hamilton to date.
If it goes some way towards re-establishing Hamilton as a forgotten Australian
modernist, then I will have succeeded in my task.

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6 Both of these sources are intended for specialist readers and are consequently difficult to read and understand at the outset. I am particularly keen in this dissertation to provide clear and logical explanations for the non-specialist reader.
7 The original manuscripts are available at Lee, "Naked Light", and have been included here in Chapter 3.5. Editions of the original manuscripts are included in Chapter 3.6, and sound recordings are included in the enclosed CD (Chapter 3.7.)
1. Elsie Hamilton: a Misconstrued Modernist

1.1. A Life and Works Sketch

Elsie Maud Hamilton was born in 1880 in Adelaide, South Australia, to William Hamilton, a wealthy Scottish merchant, and Annie Hamilton (nee Coulls). She was the youngest of eight children. The family resided in ‘Strathearn’, a large estate located on Adelaide’s prestigious East Terrace, and her family’s wealth allowed her to live a life devoid from monetary pressures, affording her privilege and access to a fine education from an early age. Though some in her position would squander this opportunity, not so Elsie Hamilton. She took every opportunity afforded to her, often winning top marks at the Advanced School for Girls. She studied piano from four years of age, and by her teenage years she was under the watchful eye of the locally renowned German pianist, Immanuel Gotthold Reimann. Hamilton achieved high marks in her piano examinations and earned prizes at various local piano competitions. In addition, at school she received prizes in German, art, mathematics and science. Her musical ability was evident in her performances as a youth: one adjudicator noting the sixteen-year old’s ‘thoroughly artistic manner.’

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10 Reimann was a German migrant. For more biographical information, see George E. Loyau, *Notable South Australians, or Colonists- Past and Present* (Adelaide: Carey, Page & Co., 1885).
this dedication and hard work won her one of the two inaugural scholarships at the Elder Conservatorium.\textsuperscript{12}

Whilst studying at the conservatorium under Reimann, Hamilton took many opportunities to perform, and she gained something of a reputation as a Chopin player. She often contributed to conservatorium concerts and to the programs of other groups and societies, such as the Bach Society and the Liedertafel society. From these concerts she was able to develop lifelong associations with other Australian musicians such as Nora Kyffin Thomas, William Silver, Amy Castles (from Melbourne), and fellow Elder Scholars, Hooper Brewster-Jones and Meta Buring.\textsuperscript{13}

On the tenth of December 1900, Hamilton and her friend Nora Kyffin Thomas gave a departing recital before leaving to study in Germany. Reimann escorted and guided the women on a brief tour of the country prior to them settling down to a formalised programme of study at the Stern Conservatorium in Berlin. He recommended Hamilton study under Ernst Jedliczka—a former pupil of Tchaikovsky and Rubenstein, and a well-known piano teacher whose pupils included Olga Samaroff.\textsuperscript{14}

Initially Jedliczka refused, but after hearing Hamilton perform he was so impressed that he immediately agreed to teach her. He later described Hamilton as being in 'one of the highest places, if not the very highest' amongst his 100 pupils.\textsuperscript{15}

\textsuperscript{12} The other recipient was a violinist named Nora Kyffin Thomas.


Upon finishing her course in Berlin, Hamilton returned to Adelaide and enjoyed a successful performing career. With her sister Ethel she lived in New Zealand, and from 1909-1910 she wrote a piano method.\footnote{Brian Lee, "Kathleen Schlesinger and Elsie Hamilton- Pioneers of Just Intonation," http://www.nakedlight.co.uk/pdf/articles/a-001-0916.pdf.} In 1912, Ethel married Hugh Rainey Gillespie, a prominent member of the Theosophy Society, and their wedding was the first ever to be held in the Adelaide Theosophical Society building.\footnote{Margaret N. Carnier. "A Woman's Letter." Daily Herald, Adelaide, 7 December, 1912, 5. Accessed 1 November 2014, http://nla.gov.au/nla.news-article105271011.} Gillespie subsequently had a career giving Theosophy lectures around Australia. He very likely introduced Theosophical ideas to Elsie Hamilton prior to her meeting Schlesinger.\footnote{The influence of Hugh Gillespie on Elsie Hamilton is presented here for the first time; it was not reported in Bowan, "Living between Worlds Ancient and Modern: The Musical Collaboration of Kathleen Schlesinger and Elsie Hamilton."}

In December 1910 Hamilton journeyed with her sister, Marion Harrold, to England and Paris. She remained in Paris for the next five years, studying composition at the Paris Conservatoire under André Geldage. ‘Feuilles d’Automne’, her only surviving piece in equal temperament, was written in 1914.\footnote{This piano piece was published by Weekes & Co., London, and is available from the British Library. It was also mentioned in Lee, "Kathleen Schlesinger and Elsie Hamilton- Pioneers of Just Intonation".} At this time Hamilton may also have travelled to Vienna to study with Alban Berg.\footnote{Killian, "Kathleen Schlesinger.". See also Rachel Elizabeth Bergman, "The musical language of Viktor Ullmann" (Ph.D., Yale University, 2001), for an example of the composer Viktor Ullman, who was also a twelve-tone composer associated with Anthroposophy.} Upon completion of her studies in 1916 she attended a Theosophical Society summer school where she met the renowned musicologist Kathleen Schlesinger.\footnote{Bowan, "Living between Worlds Ancient and Modern: The Musical Collaboration of Kathleen Schlesinger and Elsie Hamilton," 197. See also ibid., 214-20, for an account of Schlesinger’s life and professional output.} Schlesinger was a Fellow of the University of Liverpool and a member of the English Theosophical Society.\footnote{Killian, "Kathleen Schlesinger.". Note that Killian is an Anthroposophical flautist, cellist and composer. He wrote a biography of Schlesinger, in which he frequently mentioned Hamilton. He also

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reported that ‘she was so captivated by Schlesinger’s extended discussion of the ancient Greek modes, replete with demonstrations on the monochord and performances on the kithara, that she remained in England to work with her new friend and mentor for the next two decades.’ This was to be the pivotal collaboration in the life of both women, and it was the catalyst for Hamilton’s musical experiments thereafter.

Hamilton found a new purpose to her life and music after her discovery of the ancient Greek modes. She retired from her career as a concert pianist and became involved with Rudolf Steiner’s Anthroposophical movement, and at this time also started using the modes in her compositions. Aside from a private performance at a home in Princes Street, London, the first performance of Hamilton’s modal compositions occurred in 1917 at a concert in Steinway Hall, London, with the support of the local Theosophical Society. A reviewer from the Musical Times, whilst noting her ‘pretty gift of composition’, found Hamilton’s ‘L’Arbe Mystique’ (a septet in the Moon mode on the C string) ‘not at all agreeable’, though most of the criticism in the article was directed towards the Greek modes themselves.

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23 Bowan, “Living between Worlds Ancient and Modern: The Musical Collaboration of Kathleen Schlesinger and Elsie Hamilton,” 197-98. The Greek modes were also known as ‘planetary modes’ or ‘harmoniai’, and similarly these terms have been used interchangeably in this dissertation.

24 Anthroposophy was (arguably) a sub-branch of Theosophy; see Section 2.2.

25 Schlesinger and Hamilton may still have been Theosophists at this time; there is no evidence of them following the Anthroposophical movement until a meeting with Rudolf Steiner in 1921 (Killian, “Kathleen Schlesinger.”). As an archaeologist, Schlesinger had been investigating in Ancient Greek music at the University of Liverpool for a while before she came across Anthroposophy. She published a paper on the topic in 1901, 12 years before Anthroposophy was founded: see Kathleen Schlesinger, “Researches into the Origin of the Organs of the Ancients,” *Sammelbände der Internationalen Musikgesellschaft* 2, no. 2 (1901).

Aided by the dismissal of the Schlesinger’s modes within academic circles, the unfavourable press continued. In the afternoon of the 11th of May 1918, Hamilton’s ‘Trio for Oboe, Violin and Pianoforte’ (in the Hypodorian Mode) was given its first performance at the Aeolian Hall, London, alongside performances of Beethoven and Stravinsky by the London String Quartet. It was perhaps this particular choice of programme that led to the mixed reviews: one reviewer stated that ‘Miss Hamilton has chosen a delightful combination of instruments, and has written music which is free from plagiarism and diffuseness whilst another wrote that ‘the pleasing music… proved quite innocent to those with the atmospheric effects of the modern’ and that ‘Stravinsky… was far more exciting.’ Schlesinger, however, considered the performance a success, especially the feat of tuning the piano to comply with the tuning of the modes.

Hamilton also wrote some incidental music for ‘Sensa’, a play set in Ancient Egypt adapted by Maud Hoffman from the Mabel Collins’ Theosophical text ‘Idyll of the White Lotus.’ ‘Sensa’ inspired Schlesinger to create the ‘Sensa flute’ in 1917-18, a

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specialized flute with equidistant holes tuned to the Hypophrygian mode. The flute was used in Hamilton’s incidental music, but has since been lost. One surviving work, ‘Hymn to Ra’ (Chapter 3.5.5.) occurs at the beginning of Acts I and II. It is in the Sun and Venus modes, symbolizing the rising and setting of the Egyptian sun. In a diary entry, E. J. Dent called the music ‘badly out of tune’ and vague.

Figure 1: Schlesinger’s Description of the ‘Sensa’ Flute.

After three misunderstood public performances of the Greek modes, Hamilton and Schlesinger may have decided that these works were not suited to audiences unable or unwilling to perceive their significance. They mounted two further performances—in 1924 and 1929—this time choosing to stay within the safe circles of their Anthroposophists and like-minded musicians, including the Society for Women Musicians in London, for which Schlesinger was president from 1919-1921.

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31 The Sensa flute was made in 1917-18 (ibid., 233.) For more information on the flute see ibid., 225-40, 458, 63-519.


34 Hamilton and Schlesinger were involved in the Society of Women musicians between 1920 and 1925, as detailed in Laura Seddon, British Women Composers and Instrumental Chamber Music in the Early Twentieth Century (Farnham, Surrey: Ashgate Publishing, 2013); “Society of Women Musicians “, Royal College of Music, http://www.legacyweb.rcm.ac.uk/cache/f10024573.pdf.
Schlesinger became a member of the Anthroposophical society on the 10th of March 1921 and Hamilton probably joined her around that time.\textsuperscript{35} In April and May of that year they travelled to Donarch, Switzerland, to meet with Rudolf Steiner to discuss their ideas. Hamilton was invited to teach local musicians about the new modes, and Steiner encouraged the women in their musical pursuit.\textsuperscript{36} With the blessing of their leader, Schlesinger and Hamilton continued to preach their new discoveries to their fold back in London. In 1922 Hamilton founded an orchestra dedicated to the Greek modes.\textsuperscript{37} The orchestra moved to Stuttgart in 1935, where it consisted of twenty members who performed on ‘a specially constructed flute..., harps, lyres, a number of stringed instruments and a clarinet.’\textsuperscript{38} Hamilton’s old friend, the Australian composer Hooper Brewster-Jones, reported that her orchestra performed her compositions on a regular basis.\textsuperscript{39} A third orchestra was established in 1935 in Freiburg, Germany.

Schlesinger and Hamilton were invited back to meet Rudolf Steiner in 1923, this time at the Daniel N. Dunlop Summer School in Penmaenmawr, Wales.\textsuperscript{40} They gave a demonstration of the modes and Schlesinger gave a speech on ‘The Planetary Modes in terms of Modern Music and the Humanities’, in which was discussed the possibility of using the Greek Modes in Steiner’s new art-form, eurhythmy. The

\textsuperscript{35} Killian, “Kathleen Schlesinger.”
\textsuperscript{36} Letter from Hamilton to Steiner, 31 May 1921. Archives of the Rudolf Steiner Estate Administration, Donarch, quoted in ibid.
\textsuperscript{39} Ibid.
\textsuperscript{40} Killian, “Kathleen Schlesinger.”; see also Rudolf Steiner, \textit{The Evolution of Consciousness: As Revealed Through Initiation Knowledge} (James Currey Publishers, 2006), which has lectures from this school.
'modal tone eurhythmy' debuted in London in December 1923, and at that time Hamilton composed the music for the mime ‘Agave’, written by Eva Papp. Documentation for the next couple of years is vague. Hamilton followed Schlesinger in 1924 when she went to research in Italy.\textsuperscript{41} Between 1921-22 Schlesinger and Hamilton were recruited by Steiner to assist in the production of his ‘Four Mystery Dramas.’ However, the project was scuppered when the venue—the Steiner-designed Goetheanum—was burnt down on the eve of 1923. Although Steiner’s death in 1925 thwarted the production and performance of these plays, Hamilton’s incidental music found a new life in a concert of her works during a conference in 1926. During this conference in Donarch, Schlesinger gave another demonstration of her modes. Hamilton also published an article, ‘The Nature of Musical Experience in the Light of Anthroposophy’ in the journal ‘Anthroposophy.’\textsuperscript{42} Three ballet matinees were featured at the Court Theatre in London from the twenty-sixth to the twenty-eighth of November 1928. Among them was ‘The Scorpions of Ysit’, a comedy set in Ancient Egypt by the esoteric philosopher Terrence Gray. His cousin, Ninette de Valois, directed the ballet-mimes and Elsie Hamilton wrote the music. Schlesinger reported another performance of the work in 1929, but gave no comment as to its success.\textsuperscript{43} 

\textsuperscript{42} ‘Anthroposophy’ was a quarterly journal devoted to the teachings of Rudolf Steiner. Hamilton, "The Nature of Musical Experience in the Light of Anthroposophy.” 
Between 1929 and 1934 there is a lacuna surrounding Hamilton’s activities, however, Schlesinger and Hamilton likely remained in Germany. In the early thirties they collaborated with the singer Valborg Werbeck-Svärdström, who ran an Anthroposophical singing school (Schüle der Stimmenthüllung or ‘School for Uncovering the Voice’) and a choir in Hamburg. Werbeck-Svärdström, a celebrated opera singer, had also given up a promising performance career when she joined the Anthroposophical movement.\(^44\) Hamilton and Werbeck-Svärdström wrote ‘Motto für die Schüle der Stimmenthüllung’ a work that involved a solo singer and a boys’ choir (Chapter 3.5.7.) The Schüle der Stimmenthüllung continued until 1935, when the rise of Nazism made Anthroposophical activities too risky to continue in Germany.

Hamilton was invited to demonstrate the modes at a conference in Sweden or Finland in 1933 or 1934, travelling for the first time in seventeen years without Schlesinger.\(^45\) At the conference, Hamilton met Mary Wilber and Wilhelmina ‘Willy’ Roelvink, who afterwards became avid followers of Hamilton and Schlesinger.\(^46\) The next year she moved to Stuttgart, where she founded another natural intonation orchestra. This was punctuated by her first visit back to Adelaide in twenty-five years, where she stayed with her brother in East Terrace from October 1936 to February 1937. Upon her return to Europe, Hamilton spent the next few years moving ‘from city to city,

\(^44\) She was also endorsed by Rudolf Steiner as the representative and teacher of Anthroposophical singing. For more information see Eugene Kolisko’s biography of Werbeck-Svärdström, in the appendix of Valborg Werbeck-Svärdström, Uncovering the Voice: A Path Towards Catharsis in the Art of Singing (Rudolf Steiner Press, 1980).

\(^45\) A newspaper article reported that Hamilton was spoke at a conference in Sweden in 1933 ("Adelaide Woman's Most Unusual Vocation." News, Adelaide, 8 October, 1936, 15. Accessed 1 November 2014, http://nla.gov.au/nla.news-article132031587); Bowan claimed that this conference actually occurred on an island in the Gulf of Finland in 1934 (Bowan, "Living between Worlds Ancient and Modern: The Musical Collaboration of Kathleen Schlesinger and Elsie Hamilton," 240.) Schlesinger did not attend the conference as she had returned to England due to illness.

supervising the performances of her orchestras.'

Dr. Eugene Kolisko, an Anthroposophical physician, had Hamilton’s orchestra perform in his sanatorium in Vienna, as music was thought to have medicinal properties in Anthroposophy. To further its ‘curative’ effects he tried to integrate some of his patients in the orchestras, but Hamilton found it ‘not quite so agreeable.’ Nevertheless, she continued her association with the doctor because she was convinced of the ‘remarkable results’ achieved.

Hamilton ran seminars on the modes for three months in Paris, 1938, and later moved back to London.

Schlesinger’s seminal work, ‘The Greek Aulos’, which had taken her fifteen years to write, was published in 1939 and dedicated to Elsie Hamilton. By then, Hamilton had become confident enough in her two pupils, Wilbur and Roelvink, that she left them to continue her musical work. She returned to Australia in 1940, initially to attend her brother Arthur’s wedding. As there was little Anthroposophical activity in Australia at the time, Hamilton wasted no time in reestablishing herself. In Adelaide she frequently gave demonstrations of the Greek Modes and also spoke of her travels around Europe.

Hamilton was also named as a notable alumna of the Advanced

47 Brewster-Jones, "Tuning of Ancient Instruments: Elsie Hamilton's Unique Work."
48 Eugene Kolisko was also an associate of Werbeck-Svärtsström. He even wrote a chapter for her book, Werbeck-Svärtsström, Uncovering the Voice: A Path Towards Cartharsis in the Art of Singing.
49 Brewster-Jones, "Tuning of Ancient Instruments: Elsie Hamilton's Unique Work."
50 Ibid.
51 Killian, "Kathleen Schlesinger."
52 In addition, newspaper records from 1944 cite an Adelaide composer named Elsie Hamilton who entered the National Song Contest, and whose song was a finalist for South Australia and subsequently broadcast on the radio: "3 S.A. Ballads on the Air." The Mail, Adelaide, 11 November, 1944, 10. Accessed 1 November 2014, http://trove.nla.gov.au/ndp/del/article/57688763. There are no indications of any other South Australian composers with the same name, leading to the suspicion that the Elsie Hamilton of this dissertation entered the contest (though one Elsie Maude Hamilton from the same era was an amateur musician from New South Wales): "Obituary." Illawarra Mercury, Wollongong, 24 November, 1949, 2. Accessed 1 November 2014, http://nla.gov.au/nla.news-article136540727.)
School for Girls, and performed at the Elder Conservatorium’s Old Scholars’ Association concert in 1945.

During the 1950s Hamilton moved back and forth between England and Australia. In 1950 Hamilton taught at one of Rudolf Steiner’s Waldorf schools in Gloucestershire.\(^53\) She went back to Adelaide at the end of the year via New York and Los Angeles and briefly visited to Sydney to see her Theosophist sister Ethel. Then, in 1952, she returned to Sydney to give three lectures before flying back to England, again via the US.\(^54\) In 1953 Kathleen Schlesinger died. Hamilton returned to Adelaide in 1956, where she probably lived with her brother Arthur and his family at East Terrace.\(^55\) She published her final article in Germany in 1957, and died on the 7th of November 1965.\(^56\)

Elsie Hamilton’s extraordinary life serves not only as an example of the international feminine occult networks during the turn of the century as suggested by Bowan, but a story of a remarkable early Australian microtonal composer. She was part of an early twentieth-century trend of Australian artists—such as Percy Grainger and Margaret Sutherland—who relocated and found prestige, success and recognition in Europe.\(^57\)

It is curious that Hamilton’s music has remained dormant, perhaps because it is not approachable without an understanding of its context. Elsie Hamilton is a significant and original composer and deserves to be accepted into the ever-emerging canon of Australian musicians and composers.

\(^55\) As this is where she stayed during all her previous visits to Australia.
\(^56\) Hamilton’s last published article has not been found but was mentioned in Killian, "Kathleen Schlesinger." Hamilton is buried alongside her parents and siblings at West Terrace cemetery, Adelaide (“Adelaide Cemeteries Authority Search,” Adelaide Cemeteries Authority, http://www.aca.sa.gov.au/.)
1.2. Rudolf Steiner and Anthroposophy

To fully appreciate and understand Hamilton’s musical significance it is necessary to know something of Rudolf Steiner and Anthroposophy. Rudolf Steiner was an Austrian philosopher who founded the Anthroposophy movement in the early twentieth century. Previously he had led a chapter of the emerging Theosophy movement, which ‘incorporated elements of Buddhism and Hinduism refracted through a Western lens.’\(^{58}\) Whilst he had a stable career lecturing within the society during the first decade of the twentieth century, Steiner believed there was too great a focus on Eastern philosophy, and disagreed with their belief in the reincarnation of Christ. In 1913 he officially branched off into his own movement, Anthroposophy.\(^{59}\) Anthroposophy emphasized the development of the individual to ultimately contact the spiritual world, which he believed coexisted with the physical world. The Eastern notions of karma and reincarnation (from Theosophy) were combined with Steiner’s own interests in Christianity and the works of Goethe.\(^{60}\) Steiner attempted to apply scientific methodology to his spiritual studies as he believed religious and scientific


\(^{59}\) Steiner claimed that Anthroposophy ‘in form nor content had anything at all to do with the Theosophical Society’ Marcum 1989 Ursula B. Marcum, "Rudolf Steiner: An intellectual biography" (Ph.D., University of California, Riverside, 1989), 415.; Shepherd, *A Scientist of the Invisible: An Introduction to the Life and Work of Rudolf Steiner*.

\(^{60}\) Because of Goethe, science and the arts had particular emphasis in Anthroposophy: see Marcum, “Rudolf Steiner: An intellectual biography,” 480-81. ibid., 445. cited an important Goethe text, which was translated as:

Who possesses science and art
Possesses religion as well;
Who possesses the first two not
O grant him religion.
studies could complement each other, one answering the questions the other could not.\textsuperscript{61}

Steiner regarded art as a religious expression, an instinct of his ‘seven elements of the human being.’\textsuperscript{62} Through art, an individual could reach the spiritual dimension. This philosophy, like many of Steiner’s other thoughts, can be traced back to his interpretation of Ancient Greek thought. As Goethe saw value in Ancient Greek ideals and aesthetics, Steiner also sought a return to antiquity within Anthroposophy. The most notable manifestation of Steiner’s artistic values was through the development of eurhythmy, which he regarded as ‘music translated into movement.’\textsuperscript{63}

1.3. Anthroposophy and Music

The abstract nature of music favoured by the Romantics was particularly relevant to Rudolf Steiner, who interpreted it as an art originating from the spiritual world.\textsuperscript{64}

Inspired by the writings of Schopenhauer, he gave seven lectures on the importance of music in Anthroposophy between 1902 and 1923.\textsuperscript{65} Steiner placed music above the

\textsuperscript{61} A study he called ‘spiritual science.’

\textsuperscript{62} Each of the seven elements was also related to a particular musical interval. The seven elements were the physical body, the etheric body (or ‘life force’), the astral body (conscious and subconscious), the ego (or the ‘I’; human experience and memory), the spirit self (the astral body transformed by the I), the life spirit (the etheric body transformed by the I) and the atma (the fully-formed human being.) The first four are formed in human beings, who may spend their lives developing the other three. See Hamilton, “The Nature of Musical Experience in the Light of Anthroposophy.”; Marcum, “Rudolf Steiner: An intellectual biography,” 445, 49, 50. and R. Steiner, The Inner Nature of Music and the Experience of Tone, (The Anthroposophic Press, 1983). Accessed 21 October 2014, http://wn.rsarchive.org/Lectures/GA283/English/AP1983/InNaMu_index.html.

\textsuperscript{63} Marcum, “Rudolf Steiner: An intellectual biography,” 466.

\textsuperscript{64} Representational art was of the physical world (and thus disapproved of.)

\textsuperscript{65} These are collectively known as ‘The Inner Nature of Music and the Experience of Tone’. They were lectures given and transcribed between 1902 and 1923, and published in Steiner, \textit{The Inner Nature of Music and the Experience of Tone.}, and online at Rudolf Steiner, “The Inner Nature of Music and the Experience of Tone,” Rudolf Steiner Archive, http://wn.rsarchive.org/Lectures/GA283/English/AP1983/InNaMu_index.html. An alternate version of Lecture 1 was also published online: Rudolf Steiner, “The Occult Basis of Music,” Rudolf Steiner Archive, http://wn.rsarchive.org/Lectures/19061203p01.html.
other, physically-based arts, stating ‘All the other arts have to work through images and produce only pictures of the Will. But musical sound is a direct expression of the Will itself.’ 66 The importance of the art was highlighted in one of Elsie Hamiton’s few published works, ‘The Nature of Musical Experience in the Light of Anthroposophy.’ 67 This work summarised Steiner’s musical lectures. Hamilton wrote that music comes from the spiritual world, known as Devachan, which people can experience when they sleep. 68 The Devachanic world existed throughout the cosmos and was an ‘endlessly flowing and changing ocean of musical tones.’ 69 A musician recreated this tone-world when they made music. Music was seen as a bridge between the conscious and the unconscious, the physical and the spiritual, and thus had an important place in the Anthroposophic movement.

1.4. Elsie Hamilton as Modernist

Elsie Hamilton is an image of early twentieth-century musical modernism, and can be understood with reference to the experimentalist school of Hába, Varèse and Cowell. 70 Like them, she was influenced by non-Western music and esoteric belief systems, which ultimately led to the exploration of new microtonal tuning systems and non-traditional instruments. However, unlike many modernists, her music was not inspired by a philosophical objection to Romanticism. Instead she had an openness to all types of music, stating that ‘the musical and the modal represent two distinct

66 Steiner, “The Occult Basis of Music”.
68 The experience of Devachan occurs in Steiner’s ‘third state of consciousness’ (during sleep); see Rudolf Steiner, “The Inner Nature of Music and the Experience of Tone: Lecture 2,” Rudolf Steiner Archive, http://wn.rsarchive.org/Lectures/GA283/English/API983/19061112p01.html.
69 Steiner, “The Occult Basis of Music”.
70 As described in Leon Botstein, “Modernism,” in Grove Music Online (Oxford Music Online).
musical worlds, each quite complete in itself. This stance can also be seen in her ethnographic fieldwork with Schlesinger, for example travelling to Bali to collect native instruments, which can be seen as a precursor to modern ethnomusicological studies. The Finnish and Celtic folk-songs included in her works are also indicative of her curiosity towards unfamiliar types of music; the sixth Finnish folk-song (Chapter 3.5.4) was based on a tune published by Ilmari Krohn in 1932 in Laulusävelmät III, the third volume of a collection of over 9000 Finnish folk-songs.

Figure 2: A Comparison of Two Transmissions of a Finnish Folk-Song

Finnish Folk-Tune in Collection.

Hamilton’s Arrangement (Chapter 3.5.4.)


73 Taken from Eerola and Toiviainen, "Digital Archive of Finnish Folk Tunes".
Hamilton’s music can also be understood with reference to an increasingly open society, the rise of technology and perhaps also to the renewed interest in mathematics emanating from the Vienna circle.

In relation to being classified as a musical pioneer, Hamilton’s aesthetic standards certainly capture the zeitgeist of the period; in some respects she went even further. As Anthroposophy became fashionable within Europe in the early twentieth century, many composers such as Ullman, Schoenberg and Berg drew from its influence. Whilst most innovators at the time were happy to reject traditional tonality, they nevertheless grounded their music to the past by adhering to equal temperament.

Hamilton, of course, built her musical sources from a very different set of axioms. Hamilton and Schlesinger’s microtonal explorations offered an alternative pathway, and the Anthroposophical movement itself captured the ideals of the modernists. Although Anthroposophy drew inspiration from German Romanticism (particularly Goethe), it was seen as a progressive movement, and as a result Steiner was associated with the most cutting-edge artists of the period. The abstract artist Wassily Kandinsky, and members of the expressionist movement such as Schoenberg, appreciated the metaphysical nature of Steiner’s philosophy, and the notion that art was important and transformational to the individual. Hamilton was associated with, and in the company of, other modernists of her time.

2. Theoretical Underpinnings

The following chapter provides a context for understanding Elsie Hamilton’s music at a deep structural level. In doing so, I will call upon various contemporary theories of mathematics and tuning, and in particular will show how the intricate theories of Kathleen Schlesinger were ultimately realised through Hamilton’s compositions. Schlesinger’s theories were described in her seminal work, ‘The Greek Aulos.’

2.1. The Overtone and the Undertone series

Schlesinger’s theory involves a concept known as the undertone series. When a tone is played, the quality of the tone can be described in terms of its harmonic overtones. Undertones are essentially an inversion of the overtone series; the same intervals are used in the undertone series of a note but occur as a descending series. There is little evidence to support the physical existence of the undertone series, although authors such as Ruland claim that it can be heard when a tuning fork vibrates against a piece of paper. Rameau alluded to it when he noticed that strings of certain proportions would vibrate sympathetically when the open string was struck. A lack of evidence for the undertone series has resulted in its dismissal by most musicians.

75 This volume described the tuning system and attempted to provide evidence based on writings by ancient Greek philosophers and folk music from around the world. Schlesinger, *The Greek Aulos: a Study of its Mechanism and of its Relation to the Modal System of Ancient Greek Music followed by a Survey of the Greek Harmoniai in Survival or Rebirth in Folk-Music.*


and physicists, nevertheless it has been the subject of discussion by authors such as Hugo Riemann and Harry Partch.\textsuperscript{78}

2.2. The Planetary Modes and their Scientific Underpinnings

Of the overtone series, Schlesinger identified as significant the eighth to the fourteenth harmonics, and their multiples.\textsuperscript{79} These harmonics are named ‘modal determinants.’ They are outlined in Table 1 on the tone 176 Hz, which Schlesinger referred to as ‘fau’ (as it is not quite an equal-tempered F.)

\textsuperscript{78} See Chapter 6 of ibid. for a discussion of Riemann’s essays. In addition, Harry Partch, \textit{Genesis of a Music: Monophony} (Madison: University of Wisconsin Press, 1949), 89-90, cites Schlesinger’s input in Partch’s theories of Otonality and Utonality. In this passage he also states ‘The historic Arithmetical Proportion, the division of the string into a given number of exactly equal parts (not equal intervals), the ancient source of Utonality’.

### Table 1: Harmonics of the Fundamental note of 176Hz (fau) and their Closest Approximate Notes in Equal Temperament.

Significant frequencies are shaded.

<table>
<thead>
<tr>
<th>Harmonic Number</th>
<th>Frequency (Hz)</th>
<th>Closest Note</th>
<th>Equal-Tempered tuning (Hz)</th>
<th>Difference (Hz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (Fundamental)</td>
<td>176</td>
<td>F3</td>
<td>174.61</td>
<td>1.39</td>
</tr>
<tr>
<td>2</td>
<td>352</td>
<td>F4</td>
<td>349.23</td>
<td>2.77</td>
</tr>
<tr>
<td>3</td>
<td>528</td>
<td>C5</td>
<td>523.25</td>
<td>4.75</td>
</tr>
<tr>
<td>4</td>
<td>704</td>
<td>F5</td>
<td>698.46</td>
<td>5.54</td>
</tr>
<tr>
<td>5</td>
<td>880</td>
<td>A5</td>
<td>880</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>1056</td>
<td>C6</td>
<td>1046.5</td>
<td>9.5</td>
</tr>
<tr>
<td>7</td>
<td>1232</td>
<td>D#6</td>
<td>1108.73</td>
<td>123.27</td>
</tr>
<tr>
<td>8</td>
<td>1408</td>
<td>F6</td>
<td>1396.91</td>
<td>11.09</td>
</tr>
<tr>
<td>9</td>
<td>1584</td>
<td>G6</td>
<td>1567.98</td>
<td>16.02</td>
</tr>
<tr>
<td>10</td>
<td>1760</td>
<td>A6</td>
<td>1760</td>
<td>0</td>
</tr>
<tr>
<td>11</td>
<td>1936</td>
<td>B6</td>
<td>1975.53</td>
<td>-39.53</td>
</tr>
<tr>
<td>12</td>
<td>2112</td>
<td>C#7</td>
<td>2217.46</td>
<td>-105.46</td>
</tr>
<tr>
<td>13</td>
<td>2288</td>
<td>D7</td>
<td>2349.32</td>
<td>-61.32</td>
</tr>
<tr>
<td>14</td>
<td>2464</td>
<td>D#7</td>
<td>2489.02</td>
<td>-25.02</td>
</tr>
<tr>
<td>15</td>
<td>2640</td>
<td>E7</td>
<td>2637.02</td>
<td>2.98</td>
</tr>
<tr>
<td>16</td>
<td>2816</td>
<td>F7</td>
<td>2793.83</td>
<td>22.17</td>
</tr>
<tr>
<td>17</td>
<td>2992</td>
<td>F#7</td>
<td>2959.96</td>
<td>32.04</td>
</tr>
<tr>
<td>18</td>
<td>3168</td>
<td>G7</td>
<td>3135.96</td>
<td>32.04</td>
</tr>
<tr>
<td>19</td>
<td>3344</td>
<td>G#7</td>
<td>3322.44</td>
<td>21.56</td>
</tr>
<tr>
<td>20</td>
<td>3520</td>
<td>A7</td>
<td>3520</td>
<td>0</td>
</tr>
<tr>
<td>21</td>
<td>3696</td>
<td>A#7</td>
<td>3729.31</td>
<td>-33.31</td>
</tr>
<tr>
<td>22</td>
<td>3872</td>
<td>B7</td>
<td>3951.07</td>
<td>-79.07</td>
</tr>
<tr>
<td>23</td>
<td>4048</td>
<td>B7</td>
<td>3951.07</td>
<td>96.93</td>
</tr>
<tr>
<td>24</td>
<td>4224</td>
<td>C8</td>
<td>4186.01</td>
<td>37.99</td>
</tr>
<tr>
<td>25</td>
<td>4400</td>
<td>C#8</td>
<td>4434.92</td>
<td>-34.92</td>
</tr>
<tr>
<td>26</td>
<td>4576</td>
<td>D8</td>
<td>4698.63</td>
<td>-122.63</td>
</tr>
<tr>
<td>27</td>
<td>4752</td>
<td>D8</td>
<td>4698.63</td>
<td>53.37</td>
</tr>
<tr>
<td>28</td>
<td>4928</td>
<td>D#8</td>
<td>4978.03</td>
<td>-50.03</td>
</tr>
<tr>
<td>29</td>
<td>5104</td>
<td>D#8</td>
<td>4978.03</td>
<td>125.97</td>
</tr>
<tr>
<td>30</td>
<td>5280</td>
<td>E8</td>
<td>5274.04</td>
<td>5.96</td>
</tr>
<tr>
<td>31</td>
<td>5456</td>
<td>F8</td>
<td>5587.65</td>
<td>-131.65</td>
</tr>
<tr>
<td>32</td>
<td>5632</td>
<td>F8</td>
<td>5587.65</td>
<td>44.35</td>
</tr>
</tbody>
</table>

Each of the modal determinants are the basis of a set of tones. Depending on their number, they have a different planetary association and scale name.
Table 2: Planets Associated with Harmonic Numbers

<table>
<thead>
<tr>
<th>Number</th>
<th>Planet</th>
<th>Symbol</th>
<th>Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>8, 16, 32</td>
<td>Saturn</td>
<td>♄</td>
<td>Hypodorian</td>
</tr>
<tr>
<td>9, 18</td>
<td>Jupiter</td>
<td>☉</td>
<td>Hypophrygian</td>
</tr>
<tr>
<td>10, 20</td>
<td>Mars</td>
<td>♂</td>
<td>Hypolydian</td>
</tr>
<tr>
<td>11, 22</td>
<td>Sun</td>
<td>☀</td>
<td>Dorian</td>
</tr>
<tr>
<td>12, 24</td>
<td>Venus</td>
<td>♀</td>
<td>Phrygian</td>
</tr>
<tr>
<td>13, 26</td>
<td>Mercury</td>
<td>♂</td>
<td>Lydian</td>
</tr>
<tr>
<td>14, 28</td>
<td>Moon</td>
<td>☽</td>
<td>Mixolydian</td>
</tr>
</tbody>
</table>

The particular frequency used to generate a mode is known as the Arche, prime or generating tone. It has a function akin to a fundamental of the overtone series, as it is the basis for the undertone series that is used for the scales.

The set of tones generated by the modal determinants can be calculated by using the undertone series from the Arche back down to the fundamental. As the intervals of the overtone series gradually decrease in size, those of the undertone series increase in size as they move towards the fundamental.

Figure 3: The First Sixteen Members of the Overtone and Undertone Series.

Closest pitches in equal temperament are shown.

---

80 These astrological symbols can be found in Hamilton’s scores if the planet is not already spelled out. Some scores have no planetary indication.

81 Schlesinger, The Greek Aulos: a Study of its Mechanism and of its Relation to the Modal System of Ancient Greek Music followed by a Survey of the Greek Harmoniai in Survival or Rebirth in Folk-Music; Renold, Intervals, Scales, Tones and the Concert Pitch C=128Hz.
Schlesinger also noted that the interval between the Arche and the fundamental is known as the ‘generic interval.’ Harmonics that create perfect octaves with the Arche tone are known as ‘mese’ tones. For example, undertones 1/2, 1/8, 1/16 and 1/32 are meses of the Arche 2816 Hz (Table 4.) In the following example, the sixteenth harmonic (2816 Hz) has been taken from the overtone series in Table 1. Consequently, the tones generated are known as Saturn Tones (as shown by the associations in Table 2.)

**Table 3: Undertone series from Modal Determinant 16 (2816 Hz).**

Significant frequencies are shaded.

<table>
<thead>
<tr>
<th>Ratio</th>
<th>Frequency (Hz)</th>
<th>Note</th>
<th>Equal-Tempered tuning (Hz)</th>
<th>Difference (Hz)</th>
<th>Hamilton’s tuning note</th>
<th>Hamilton’s Equal Tempered tuning</th>
<th>Difference (Hz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2816</td>
<td>F7</td>
<td>2793.83</td>
<td>22.17</td>
<td>F7</td>
<td>2771.01</td>
<td>44.99</td>
</tr>
<tr>
<td>1/2</td>
<td>1408</td>
<td>F6</td>
<td>1396.91</td>
<td>11.09</td>
<td>F6</td>
<td>1385.51</td>
<td>22.49</td>
</tr>
<tr>
<td>1/3</td>
<td>938.67</td>
<td>A#5</td>
<td>932.33</td>
<td>6.34</td>
<td>A#5</td>
<td>924.715</td>
<td>13.95</td>
</tr>
<tr>
<td>1/4</td>
<td>704</td>
<td>F5</td>
<td>698.46</td>
<td>5.54</td>
<td>F5</td>
<td>692.75</td>
<td>11.25</td>
</tr>
<tr>
<td>1/5</td>
<td>563.2</td>
<td>C#5</td>
<td>554.37</td>
<td>8.83</td>
<td>D5</td>
<td>582.53</td>
<td>-19.33</td>
</tr>
<tr>
<td>1/6</td>
<td>469.33</td>
<td>A#4</td>
<td>466.16</td>
<td>3.17</td>
<td>A#4</td>
<td>462.36</td>
<td>6.97</td>
</tr>
<tr>
<td>1/7</td>
<td>402.29</td>
<td>G4</td>
<td>392</td>
<td>10.29</td>
<td>G4</td>
<td>388.79</td>
<td>13.5</td>
</tr>
<tr>
<td>1/8</td>
<td>352</td>
<td>F4</td>
<td>349.23</td>
<td>2.77</td>
<td>F4</td>
<td>346.38</td>
<td>5.62</td>
</tr>
<tr>
<td>1/9</td>
<td>312.89</td>
<td>D#4</td>
<td>311.13</td>
<td>1.76</td>
<td>D#4</td>
<td>308.59</td>
<td>4.3</td>
</tr>
<tr>
<td>1/10</td>
<td>281.6</td>
<td>C#4</td>
<td>277.18</td>
<td>4.42</td>
<td>C#4</td>
<td>274.92</td>
<td>6.68</td>
</tr>
<tr>
<td>1/11</td>
<td>256</td>
<td>C4</td>
<td>261.63</td>
<td>-5.63</td>
<td>C4</td>
<td>259.49</td>
<td>-3.49</td>
</tr>
<tr>
<td>1/12</td>
<td>234.67</td>
<td>A#3</td>
<td>233.08</td>
<td>1.59</td>
<td>A#3</td>
<td>231.18</td>
<td>3.49</td>
</tr>
<tr>
<td>1/13</td>
<td>216.62</td>
<td>A3</td>
<td>220</td>
<td>-3.38</td>
<td>A3</td>
<td>218.204</td>
<td>-1.58</td>
</tr>
<tr>
<td>1/14</td>
<td>201.14</td>
<td>G3</td>
<td>196</td>
<td>5.14</td>
<td>G#3</td>
<td>205.96</td>
<td>-4.82</td>
</tr>
<tr>
<td>1/15</td>
<td>187.73</td>
<td>F#3</td>
<td>185</td>
<td>2.73</td>
<td>F#3</td>
<td>183.49</td>
<td>4.24</td>
</tr>
<tr>
<td>1/16</td>
<td>176</td>
<td>F3</td>
<td>174.61</td>
<td>1.39</td>
<td>F3</td>
<td>173.2</td>
<td>2.8</td>
</tr>
</tbody>
</table>

---

82 Hamilton stated that an equal-tempered middle C was 259.59Hz (Hamilton, *The Modes of Ancient Greece*), so the undertone series was also compared to the tuning of Hamilton’s era.

83 Based on the assumption that C=259.59Hz.
## 2.3. Properties of the Modes

The particular frequencies used for the modes have been taken from undertones 1/8-1/16 (and their multiples) of an Arche. In the example above, these are 352 Hz (1/8), 312.89 Hz (1/9), 281.6 Hz (1/10), 256 Hz (1/11), 234.67 Hz (1/12), 216.62 Hz (1/13), 201.14 Hz (1/14) and 187.3 Hz (1/15). To complete the octave the sixteenth undertone is added on, however, this leads to nine notes in the octave. To combat this Schlesinger proposed using either undertone 14 or 15 in the scale, but not both.

Hamilton indicated that the Moon mode must omit undertone 15, and Renold added that the Saturn and Jupiter modes omit undertone 14.\(^{84}\) Since the scale above was based on the sixteenth undertone, it is considered the Hypodorian or Saturn mode and, according to Renold, would omit the fourteenth undertone.

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\(^{84}\) Hamilton, *The Modes of Ancient Greece*.; Renold, *Intervals, Scales, Tones and the Concert Pitch*.

\[C=128Hz: 36.\]
In the other modes, different undertone numbers are used. The Dorian or Sun mode, for example, is based on undertone 11 (as indicated by Table 2.) The tones used in the Dorian mode will be all instances of partials 8-16 (and their multiples) that are found within the undertones 11-22, i.e. undertones 11, 12, 13, 14, 16 (multiple of 8), 18 (multiple of 9), 20 (multiple of 10) and 22. Schlesinger and Renold emphasised that although the modes are realised in a descending fashion, they should be thought of as ascending scales. The particular undertones employed in the modes are shown in Table 5 and have been listed in ascending order.

<table>
<thead>
<tr>
<th>Table 4: The Undertones used in the Planetary Modes and their Ratios</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Degree</strong></td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td>Hypodorian Saturn++</td>
</tr>
<tr>
<td>Hypophrygian Jupiter</td>
</tr>
<tr>
<td>Hypolydian Mars</td>
</tr>
<tr>
<td>Dorian Sun</td>
</tr>
<tr>
<td>Phrygian Venus</td>
</tr>
<tr>
<td>Lydian Mercury</td>
</tr>
<tr>
<td>Mixolydian Moon</td>
</tr>
</tbody>
</table>

4 Numerators 8 and 16 = mean. ** Ptolemaic planetary sequence. +++ 14th undertone must be left out. ++++ 15th undertone must be left out.

The above examples cite 2816Hz as the Arche and, as it was based on overtone 16, the frequencies generated are known as Saturn tones. As Schlesinger identified the
overtones 8-14 as significant, then theoretically there could be seven different Arches, which would in turn produce seven different frequencies for each note. Schlesinger addressed this issue in ‘The Greek Aulos’ by proposing a common Arche instead of using a common fundamental tone.\footnote{Schlesinger, The Greek Aulos: a Study of its Mechanism and of its Relation to the Modal System of Ancient Greek Music followed by a Survey of the Greek Harmoniai in Survival or Rebirth in Folk-Music. 1-35.} In this manner, all scales could be produced using the same frequencies. She recommended two types of tuning: one to a fundamental of 128 Hz (a flat-sounding C), and one of 176 Hz (fau)\footnote{Renold, Intervals, Scales, Tones and the Concert Pitch C=128Hz: 27-38.}. These tones are related: 128 Hz occurs in the undertone series with a fundamental of 176 Hz (see Table 3), and vice versa. The only reasoning or significance stated for these tones, other than Schlesinger’s studies of the aulos instruments which she claimed produced these tones, was given in a statement from Rudolf Steiner to Schlesinger.\footnote{In ibid., 69-72. , Steiner is said to have verbally suggested that ‘C=128Hz=Sun’ to Schlesinger and Hamilton, but no explicit reference was given.} Renold suggested that the tones generated from this particular frequency were more natural and appealing to humans. Hamilton agreed, suggesting that listeners may ‘experience a rebirth while listening to the natural tones of these Ancient Modes.’\footnote{Ibid., 77-79; Hamilton, The Modes of Ancient Greece.} Saturn tones are the tones employed in Hamilton’s compositions.\footnote{As indicated in Schlesinger, The Greek Aulos: a Study of its Mechanism and of its Relation to the Modal System of Ancient Greek Music followed by a Survey of the Greek Harmoniai in Survival or Rebirth in Folk-Music. 541-46.} Interestingly, Hamilton did not use the same note names as indicated by the Table 3.\footnote{ie. F, F-sharp, A, A-sharp, C C-sharp, D-sharp, F, and their enharmonic equivalents.} She claimed that the Saturn Mode contains the tones F-sharp, G, A-sharp, B, C, D, E and F-sharp.\footnote{Hamilton, The Modes of Ancient Greece.} These are the same tones used in her compositions (as seen in her surviving manuscripts included in Chapter 3.5.) Furthermore, in ‘The Modes of Ancient Greece’, she states that ‘the sharp concert pitch of today rises to 259.49 vps for
middle C’ and that ‘our modern concert pitch . . . to my ears sounds almost a semitone too high.’ This is likely why Hamilton chose to notate all the tones (except C) a semitone higher than equal-tempered pitch (even given her C=239.49Hz equal-temperament tuning standard indicated in the Table 4.) Alternatively, Schlesinger may have already established names for the tones before Hamilton discovered and used them. Given the assumption that Hamilton’s compositions were based on Saturn tones, the scales are interpreted in Table 5. 

Table 5: Tones Employed by Hamilton.

<table>
<thead>
<tr>
<th>Scale</th>
<th>Tone and its Hertz value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sun/ Dorian</td>
<td>C 256Hz D 281.6Hz E 312.89Hz F-sharp 352Hz G 375.46Hz OR G-sharp 402.28Hz A-sharp 433.24Hz B 469.22Hz C 512Hz</td>
</tr>
<tr>
<td>Phrygian/Venus B 234.67Hz C 256Hz D 281.6Hz E 312.89Hz F-sharp 352Hz G 375.46Hz OR G-sharp 402.28Hz A-sharp 433.24Hz B 469.22Hz</td>
<td></td>
</tr>
<tr>
<td>Mercury/Lydian A-sharp 216.62Hz B 234.67Hz C 256Hz D 281.6Hz E 312.89Hz F-sharp 352Hz G 375.46Hz OR G-sharp 402.28Hz A-sharp 433.24Hz</td>
<td></td>
</tr>
<tr>
<td>Moon/Mixolydian G-sharp 201.14Hz A-sharp 216.62Hz B 234.67Hz C 256Hz D 281.6Hz E 312.89Hz F-sharp 352Hz G-sharp 402.28Hz</td>
<td></td>
</tr>
<tr>
<td>Saturn/Hypodorian F-sharp 176Hz G 187.73Hz A-sharp 216.62Hz B 234.67Hz C 256Hz D 281.6Hz E 312.89Hz F-sharp 352Hz</td>
<td></td>
</tr>
<tr>
<td>Jupiter/Hypophrygian E 156Hz F-sharp 176Hz G 187.73Hz A-sharp 216.62Hz B 234.67Hz C 256Hz D 281.6Hz E 312.89Hz</td>
<td></td>
</tr>
<tr>
<td>Mars/Hypolydian D 140.8Hz E 156Hz F-sharp 176Hz G 187.73Hz OR G-sharp 201.14Hz A-sharp 216.62Hz B 234.67Hz C 256Hz D 281.6Hz</td>
<td></td>
</tr>
</tbody>
</table>

94 Ibid.
95 This table is based on a similar guide written by Kathleen Schlesinger and shown in Renold, *Intervals, Scales, Tones and the Concert Pitch C=128Hz*: 37.
It is therefore possible to recreate the modes using a piano or electronically by tuning these frequencies and their octaves.

Hamilton and Schlesinger saw the planetary modes being related to the central tenets of the Anthroposophic belief system. Anthroposophists made a connection between number, music and nature that is reflected in the theory of the Planetary Modes through the ratios used and the cosmic associations. Schlesinger stated:

‘If… you possessed this occult wisdom, this knowledge of the hidden forces of Nature and of Life, and of the relations of numbers or harmony, you would know first of all the proportions or numbers of all created objects and substances, bodies, and living beings; the number, in fact, which is the factor of cohesion… It is number or ratio which is the sole agent of differentiation. It is harmony— Music.96.’

3. Elsie Hamilton: Twelve Microtonal Compositions

3.1. An Introduction

Thirteen works survive by Elsie Hamilton. A very conventional piano piece, published in 1914, is unrepresentative, however the remaining twelve works are directly influenced through her fascination with Greek musical theory, the planetary modes and the theories of Anthroposophy.\(^{97}\) The works are short and are scored for chamber forces, often employing exotic instruments. The music survives in a series of manuscripts now available online.\(^{98}\) The blog also contains a selection of scores by Hamilton’s student, Wilhelmina Roelvink, and a number of unsigned scores written in the Planetary Modes. Two distinct styles of handwriting are present, though it is unclear if either is the hand of Elsie Hamilton.

Figure 4: The Paleography in Hamilton’s Scores; Two Different Hands.

Hand 1.

Hand 2.

\(^{97}\) The early piece in equal temperament, ‘Feuilles d’Automne’, was not examined in this dissertation as it was written before Hamilton’s discovery of the planetary modes. See footnote 19 for more information on this piece.

\(^{98}\) Lee, “Naked Light”.
The table below collates these two hands with the various surviving works.

**Table 6: Summary of Scores.**

**EH- Elsie Hamilton; WR- Wilhelmina Roelvink.**

Scores are included in Chapter 3.5.

<table>
<thead>
<tr>
<th>Piece</th>
<th>Composer</th>
<th>Hand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hymn to Ra from Sensa</td>
<td>EH</td>
<td>1</td>
</tr>
<tr>
<td>Wenn der Mensch warm in Liebe</td>
<td>EH</td>
<td>2</td>
</tr>
<tr>
<td>Olaf Asteson</td>
<td>EH</td>
<td>2</td>
</tr>
<tr>
<td>Finnisches Volkslied mit Begleitung für Klarinette</td>
<td>EH</td>
<td>2</td>
</tr>
<tr>
<td>Keltisches Volkslied</td>
<td>EH</td>
<td>2</td>
</tr>
<tr>
<td>Steigt hinan zu höhrem Kreise</td>
<td>EH</td>
<td>1</td>
</tr>
<tr>
<td>Natur-Stimmûng</td>
<td>EH</td>
<td>1</td>
</tr>
<tr>
<td>Exercise in the Saturn Scale</td>
<td>EH</td>
<td>1</td>
</tr>
<tr>
<td>Ecce Homo</td>
<td>EH</td>
<td>1</td>
</tr>
<tr>
<td>Stück für drei Leieru</td>
<td>EH</td>
<td>1</td>
</tr>
<tr>
<td>Piece for Lyres (arrangement of Stück für drei Leieru)</td>
<td>EH</td>
<td>2</td>
</tr>
<tr>
<td>Motto für die Schüle der Stimmenthüllung</td>
<td>EH</td>
<td>2</td>
</tr>
<tr>
<td>Cradle Song</td>
<td>WR</td>
<td>2</td>
</tr>
<tr>
<td>Funeral March</td>
<td>WR</td>
<td>2</td>
</tr>
<tr>
<td>Hintemlied für Flöte &amp; Sopran Leier</td>
<td>WR</td>
<td>3</td>
</tr>
<tr>
<td>Kleine Planeten Suite</td>
<td>WR</td>
<td>2</td>
</tr>
<tr>
<td>Little Melody</td>
<td>WR</td>
<td>2</td>
</tr>
<tr>
<td>Piece in the Jupiter Mode</td>
<td>WR</td>
<td>2</td>
</tr>
<tr>
<td>Lummerlied für Stimmer und Alt Leier</td>
<td>WR</td>
<td>2</td>
</tr>
<tr>
<td>Mit Andacht</td>
<td>Unknown</td>
<td>2</td>
</tr>
<tr>
<td>Jupiter Stück</td>
<td>Unknown</td>
<td>2</td>
</tr>
<tr>
<td>Mars Stück</td>
<td>Unknown</td>
<td>2</td>
</tr>
</tbody>
</table>

Given that Roelvink was Hamilton’s student and that almost all her scores were written by Hand 2, she may have been Hamilton’s copyist.
3.2. Harmonic language and the Planetary Modes

In the ‘new language of music’ traditional harmonic relationships or analyses are not applicable. To study pieces written in the planetary modes, it is essential that the harmonies be understood in relation to Schlesinger’s The Greek Aulos.’\textsuperscript{99} As well as utilizing traditional chords (major or minor triads) that could be approximated in certain modes, Hamilton tended to base her harmonies on tetrachords, octaves and fourths, as they were symbolically significant in Steiner’s musical philosophy. Steiner believed that music, including musical intervals, were ‘experienced with the whole human being.’\textsuperscript{100} Musical intervals symbolised his ‘seven elements of the human being’, with the ascending scale representing the ascent of man into the spiritual world. The interval of the fourth represented the border between the physical world (represented by small intervals) and the spiritual world (by larger intervals.) The octave united the two worlds, so that the listener could be ‘reborn at a higher level.’\textsuperscript{101} As Steiner thought that musical pleasure was ‘the right accord between the harmonies brought from beyond and the tones and melodies here’, Hamilton and Schlesinger tried to recreate those harmonies in their music. In ‘The Greek Aulos’ Schlesinger recommended building chords from the outer two notes of the scales’ tetrachords.\textsuperscript{102}

\textsuperscript{101} Steiner believed humans had yet to evolve the capacity to ‘feel’ the octave, but ‘in the future the feeling for the octave will be something completely different and will one day be able to deepen the musical experience tremendously.’ See footnote 62; Hamilton, “The Nature of Musical Experience in the Light of Anthroposophy.”; Steiner, “The Inner Nature of Music and the Experience of Tone: Lecture 5”.
\textsuperscript{102} Schlesinger, \textit{The Greek Aulos: a Study of its Mechanism and of its Relation to the Modal System of Ancient Greek Music followed by a Survey of the Greek Harmoniai in Survival or Rebirth in Folk-Music}. 543.
The chords in the above example contain the fourth and octave, significant intervals indicated by Steiner. This particular arrangement of tetrachords within an octave is prevalent in many of Hamilton’s compositions (as seen in Figure 5.) Though traditional analyses would consider these chords dissonant, Schlesinger and Hamilton insisted that all modal tones ‘may all be used melodically, harmonically, and contrapuntally together’, stating that such harmonies are ‘entirely devoid of beats.’

Table 7: The Modal Tetrachords.

<table>
<thead>
<tr>
<th>Scale</th>
<th>Lower Tetrachord</th>
<th>Upper Tetrachord</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sun/Dorian</td>
<td>C, F-sharp</td>
<td>G, C OR G-sharp, C</td>
</tr>
<tr>
<td>Phrygian/Venus</td>
<td>B, E</td>
<td>F-sharp, B</td>
</tr>
<tr>
<td>Mercury/Lyidian</td>
<td>A-sharp, D</td>
<td>E, A-sharp</td>
</tr>
<tr>
<td>Moon/Mixolydian</td>
<td>G-sharp, C</td>
<td>D, G-sharp</td>
</tr>
<tr>
<td>Saturn/Hypodorian</td>
<td>F-sharp, B</td>
<td>C, F-sharp</td>
</tr>
<tr>
<td>Jupiter/Hypophrygian</td>
<td>E, A-sharp</td>
<td>B, E</td>
</tr>
<tr>
<td>Mars/Hypolydian</td>
<td>D, G OR D, G-sharp</td>
<td>A-sharp, D</td>
</tr>
</tbody>
</table>

103 Ibid.
104 Ibid., 542.
Schlesinger also recommended combining tetrachords with tones in common, or resolving dissimilar tetrachords to a chord common to both.\textsuperscript{106} In ‘Exercise in the Saturn Scale’, Hamilton shows that tetrachords can also be resolved in a stepwise fashion as the A-sharp of the Mercury tetrachord and the C of the Sun tetrachord resolve to the B of the Venus triad.

\textsuperscript{105} Chords as named after the octave on which they occur
\textsuperscript{107} Note that ibid., shows a Phrygian tetrachord stacked on a Hypophrygian tetrachord (and a similar arrangement of the other chord examples), but the Phrygian tetrachord consists of the notes F-sharp and B. Therefore, it is thought that Schlesinger intended the upper tetrachord of the Phrygian mode combined with the lower tetrachord of the Hypophrygian mode. The same reasoning has been applied to the following example, ie. the ‘top’ tetrachord is considered an Upper Tetrachord and the ‘bottom’ tetrachord as a Lower Tetrachord.
As seen from the above examples, the intervals that were significant within the Anthroposophical movement were employed as harmonic language within Hamilton’s works.

### 3.3. Instrumentation

Hamilton’s choice of instrumentation was based partly upon what she knew about performance practice in ancient Greece, and partly upon what was readily available to her. Consequently, her scores can feature lyres alongside modern clarinets, violins and flutes. Steiner theorised that ‘all instruments like the flute or violin originate musically from the higher world’, and moreover, these instruments were in tune with (or connected to) different parts of the body.\(^{108}\) Apart from being an instrument of ancient Greek origin, and therefore fit to perform the ‘ancient’ modes, plucked stringed instruments such as the lyre were ‘closest to the spiritual reality of musical tone’ as they were seen as the least timbre-based of the instruments.\(^{109}\) Lyres were also held near the heart, and so ‘experienced’ in the chest and ‘expressed’ in the arms.\(^{110}\) In contrast, the piano was ‘created only in the physical world by man’, and Steiner mentioned that ‘man must get away from the impressions of the piano if he wishes to experience the actual musical element.’\(^{111}\) Although Hamilton occasionally performed on the piano, Steiner’s preference for the lyre heavily influenced the instrumentation of her works.

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110 Steiner, "The Inner Nature of Music and the Experience of Tone: Lecture 6".
111 Ibid.
All but one of Hamilton’s scores utilize the lyre. They were likely the predominant instruments employed in her orchestras. In addition, eight of the scores include parts for voices. As music was an art from the spiritual world, the expression of the spirit came through the human voice and was thus labeled the most important instrument. Singing remains an important element of Anthroposophical education, and this is shown both by Werbeck-Svärdström’s previous work within Steiner’s Waldorf schools today. The instrumentation of Hamilton’s works was as much a spiritual decision as it was as a practical one, as ‘the soul, through the hearing-organism, plays the instrument.’

3.4. Revival of the Music

Hamilton’s music and her remarkable legacy were silenced long ago. One of the reasons for undertaking this research was to once again bring this music back to life, and to that end, I have created editions of all her works and have provided sound files in their original tunings. As playing the music in live performance was not a practical option (it involved specially-tuned lyres amongst other considerations) it is hoped these sound files will serve as a catalyst for subsequent live performances. The sound files are included in the enclosed CD.

The scores were typeset in Sibelius 7 for Mac. Whilst on the surface the notation looks unproblematic, there are in fact many instances that require editorial

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112 This is also indicated in newspaper articles such as Brewster-Jones, “Elsie Hamilton in Adelaide: Unusual Form of Musical Study."
113 Andrea Intveen and Jane Edwards, "The History and Basic Tenets of Anthroposophical Music Therapy," *Voices* 12, no. 2 (2012).
114 Werbeck-Svärdström, *Uncovering the Voice: A Path Towards Cartharsis in the Art of Singing*.
115 Ibid., 49.
intervention. For example, Sibelius does not allow for the input of nonstandard key signatures such as those found in ‘Wenn der Mensch Warm in Liebe’ (Chapter 3.5.12.) The accidentals were therefore put in manually (except for F-sharp which was used as the key signature.) This method also eases the task of modern musicians wishing to play the pieces who perhaps are not as accustomed to seeing such unusual key signatures. It is interesting that Hamilton, or her copyists, often wrote in accidentals next to the note, as well as using them in the key signature of the manuscripts (as in the G-sharps of Figure 8); perhaps they too needed to be reminded of the accidentals in their music.

Figure 8: The Unusual Key Signature of ‘Wenn der Mensch Warm in Liebe.’

Manuscript (Chapter 3.5.12.)  Sibelius Version (Chapter 3.6.12.)

The scores were re-tuned using the tuning software Tune Smithy 3. Tune Smithy is a MIDI output device from Sibelius 7 that is compatible with the Windows operating system. A virtual Windows 7 machine (Oracle VM’s Virtualbox) was thus installed on my Macintosh computer, and Sibelius 7 was also installed into the Windows machine so that the scores could be opened. To re-tune a score in Sibelius, the

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118 Virtualbox is available at “VirtualBox,” Oracle Corporation, https://www.virtualbox.org/.
MIDI output device had to be changed to Tune Smithy, and Tune Smithy had to have its input device changed to Sibelius. To do this, a virtual MIDI cable was installed. Once the programs were linked up, the sounds heard on Sibelius 7 were filtered through Tune Smithy, thus allowing further manipulation. The frequency of each scale degree of the planetary modes (in Hz) was input into Tune Smithy and the pieces were played through Sibelius. The lyre parts in Sibelius were changed to lever harp, as this was perhaps the closest available sounding option. Through modern technology such as Tune Smithy and Sibelius, Hamilton’s music can be heard with a degree of intonational precision perhaps not possible in her time.

Figure 9: Tune Smithy 3 and Sibelius 7 setup on Windows

120 Because Tune Smithy assigned the Hertz values to their closest note in equal temperament, it follows that the resultant Sibelius file did not always correspond exactly to Hamilton’s intentions. Thus, for the sound files, I manually altered almost every note to the correct frequency.
Once the scores were correctly tuned, they were recorded using Audacity for Mac, as Sibelius did not allow me to export the audio files of pieces that used an external MIDI device.\footnote{Available via "Audacity," Audacity Development, http://audacity.sourceforge.net/download/mac.} The recordings are given in Chapter 3.7.
3.5. Original Manuscripts ................................................................. p. 39 - 64

Chapter 3.5 has been omitted at the request of the author
Andante Moderato

Lasst uns dir Bäume lieben, die

Andante Moderato

Bäume sind uns gut, in ihren grünen Trieben strömt

Got tes Lebensblut. Einst wollt das Holz verhärten, da

rit. A tempo rall.
hing sich Christ daran, dass wir uns neu ernährten, ein ewiges Blühbegann
3.6.2 Ecce Homo

Venus Scale

Rudolf Steiner

Elsie Hamilton
ed. Talisha Goh

In dem Herzen we-bet Fühlen, In dem

Haup-te leuch-tet Den-ken, In den Glie-dern kraf-tet Wol-len

Voice

Clarinet or Violoncello

Lyre I

Lyre II

Alto Lyre
Weben des Leuchten, Kraft des Weben,
Leuchten des Kraften, Das ist der

Mensch
3.6.3 Exercise in the Saturn Scale

Saturn Scale

Elsie Hamilton
ed. Talisha Goh

Voices

Soprano Lyre I

Soprano Lyre II

Alto Lyre I

Alto Lyre II

 Allegro moderato

Elsie Hamilton
ed. Talisha Goh

Saturn Scale

 Allegro moderato
3.6.4 Finnisches Volkslied mit Begleitung Für Klarinette
Finnish Folksongs with accompaniment for Clarinet

Vivo
Jupiter Scale

Clarinet

Lyre

Elsie Hamilton
ed. Talisha Goh
4.
Saturn Scale
7.
Sun and Venus Scales
3.6.5 Hymn to Ra
(from 'Sensa')

Sun and Venus Scales

Elsie Hamilton
ed. Talisha Goh

Hail, all Hail Thou who art

Ra Thou risest, Thou settest, Thou shinest, Thou

war - - - mest, Thou, who art
crowned King of the Gods
3.2.6 Keltisches Volksleid

Saturn Scale

Elsie Hamilton

Clarinets I and II

Alto Lyre

Vivo

div.

ff

œ œ

œ œ

œ œ

œ œ
3.6.7 Motto fur die Schüle der Stimmenthüllung
Anthem for The School for Uncovering the Voice

Valborg Werbeck-Svärdström
Venus Scale

Andante Moderato

Solo Voice

Choir

High Lyre

Soprano Lyre I

Soprano Lyre II

Alto Lyre

Else Hamilton
ed. Talisha Goh

Venus Scale

Anthem for The School for Uncovering the Voice
Sterne
Himmelszeichen
der
Aufgen gesungen
(Sung on)

man kos mis-chen
Wahrheit
Zu hau-ten ger-

8
rou - nen, Schen - ket Ihr uns Eu - er ei - 

ge - nes we - sen
Ihr Sphären-Klanges Welt-
ten, aus Got-

tes Grade gebor-
en
O tünnet dunh strömet uns Heilig, mit

reinigender Kraft
3.6.8 Natur-Stimmûng
"Natural Tuning"
for Flute, Violin and Lyres
Elsie Hamilton
ed. Talisha Goh

Jupiter and Malkos Scales

Allegro moderato
Very Ethereal

Flute
Violin
Soprano Lyre I
Soprano Lyre II
Alto Lyre

Heartbeat
list to me and hear my song
The song of a wonder-ful youth, I'll
list to me and hear my song
The song of a wonder-ful youth, I'll
sing you of Olaf Ásteason who slept many days, 'tis the truth,

Yes it was Olaf Ásteason who lay so long asleeping

It was Christmas Eve which down he lay and slept so long all un
know - ing He ne - ver wake till the thir - teenth day when to

church the peo - ple were go - ing

Yes it was O - laf

Ås - teson who lay so long a - sleep - ing
"Twas the Holy night when down he lay such wonders seeing and hearing. And wakened not 'til the thirteenth day when the drowsy birds were stirring. Yes it was Olaf Ásteason who lay so long a-

Mit Andacht (With Devotion)
sleeping

He never wake till the

sleeping

thirteenth day when the Sun came up at dawning Then saddled his horse and

rode away to ride to church in the morning

Yes it was Olaf
As - te-son who lay so long a-sleep - ing

The Priest he stood at the al-tar there the Ho-ly Gos-pel ex-pound-ing While

O-laf sat down at the out-er door And told of his vis-sions as-tound-ing
Yes, it was Olaf Æsteen who lay so long a—
sleep—

sleep—

Yes it was Olaf Æsteen who lay so long a—

sleep—

sleep—
3.6.10 Steigt hinan zu höherem Kreise
From Goethe's 'Pater Seraphicus', *Faust* Part II Act 5

Johann Wolfgang von Goethe
Elsie Hamilton
Jupiter Scale
ed. Talisha Goh

Energisch (Energetic)

Steigt hi-nan zu hö-herm Kreise, Wach-set im-mer un-ver-merkt,

Energisch (Energetic)

Wie, nach e-wig rei-ner Wei-se, Got-tes Ge-gen-wart ver-tärkt.

Denn das ist der Gei-ster Nah-rung, Die im frei-sten Ä-ther walt-et,
E-\text{-wi-gen} Lie\-bens Of-fen-\text{-ba-rung}, Die zur Selig-\text{-keit} enfal-tet.

Singend keine Eile (Sung without hurry)
3.6.11 Stück für drei Leieru

Venus Scale

Largo

Soprano Lyre I

Alto Lyre I

Alto Lyre II

Etwas bewegter (Moving)

Elsie Hamilton
ed. Talisha Goh
Etwas zurückhalten (Held back)
rall.
Vorwaïts gehen (Go forwards)
3.6.12 Wenn der Mensch warm in Liebe

Rudolf Steiner

Venus Scale

Voice

Soprano Lyre

Alto Lyre

Andante

Ruhig getragen (Quiet and majestic)

Wenn der Mensch warm in Liebe,

Andante

Ruhig getragen (Quiet and majestic)

Liebe, sich der welt als Seele giot, Wenn der Mensch, Lich-tim

Sin-nen, von der welt den Geist er-wirist, wird in Geis-ter hel-ter
Seele, wird in Seele get-ra-ge-nem Geist, der Geist - es Mensch im
Lei - bes Men-schim sich Wahr-haft offen ba - ren
Conclusion

A musical pioneer, the most original of thinkers, an uncompromising radical and arguably Australia’s most undeservedly forgotten composer, Elsie Hamilton’s life and music is presented here in the contexts through which it needs to be properly understood.

This dissertation represents the most complete account of Hamilton’s life and works to date, and is informed at every stage by original research. Through examining the theories of the Anthroposophical movement, I have demonstrated how her music feeds from this belief system, and have also demonstrated that Hamilton’s stance is congruent with other modernists of her generation. In addition, I position Hamilton’s modal system within the complex mathematics of Greek musical theory (as conceived by her collaborator, Kathleen Schlesinger). Finally, I provide modern editions and electronically manipulated sound files to all of Hamilton’s surviving compositions.

Elsie Hamilton’s story is fascinating. This dissertation welcomes her into the canon of music history.
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"Miss Schlesinger and 'Natural Intonation.' A Demonstration." The Musical Times 59, no. 899 (1918): 25.


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