DECRYPTING ELGAR'S 'DARK SAYING': A MUSIC BOX CIPHER

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It may well be doubted whether human ingenuity can construct an enigma of this kind which human ingenuity, if properly applied, may not also resolve.

EDGAR ALLAN POE

Introduction

Edward Elgar (1857-1934) was captivated by secret codes, riddles and wordplay. As Michael Kennedy observed, Elgar "loved puns, acrostics, secret codes and crossword puzzles."[1] It should come as no surprise the Enigma Variations harbor numerous ciphers that encode the solutions to its three central riddles:

1. What is the covert melodic Principal Theme?
2. What is the 'dark saying' hidden in the Enigma Theme?
3. Who is the secret friend portrayed in Variation XIII?

Within the Enigma Theme there are credible ciphers that furnish specific, mutually reinforcing answers to these enduring questions. In support of this assessment, four divergent cryptograms and their resolutions will be described:

1. Locks Cipher
2. Keys Cipher
3. Psalm Cipher
4. Music Box Cipher

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[1] Kennedy, Michael. *The Life of Elgar (Musical Lives).* illustrated edition ed. New York: Cambridge University Press, 2004, p. 68

The Locks Cipher

Ciphers are meant to be broken, but first they must be found. An obvious place to begin this search is at the beginning with the oddly constructed Enigma Theme. The very title suggests a cipher. These opening six measures are of special interest because of an oddly placed double bar at the end of measure 6. In music a double bar typically signals the end of a section, so the placement of one so close to the beginning is decidedly anomalous. The most promising starting point to uncover a cipher (if there is one) is the Enigma Theme's opening six measures. To detect the presence of a cipher, the Enigma Theme was subjected to the most basic forms of cryptanalysis. After extensive testing, a strict substitution cipher involving the melody notes alone was ruled out. Such an approach would be far too simple and obvious for an expert cryptography like Elgar. A more sophisticated approach should be anticipated to expose any of the Enigma Theme's elusive ciphers.

The odd placement of the double bar at the terminus of measure 6 hints at a cipher in these opening measures. An analysis of these measures revealed the total number of notes performed by the four active instrumental parts did not exceed the number of letters in the English alphabet. This feature suggests a Letter Number Cipher in which the total number of notes for each part is converted into the corresponding letter in the alphabet.

The total notes performed by each instrumental part were counted over the first six measures of the Enigma Theme. Instrumental parts with active notes over these measures are the first and second violins, violas and cellos. The first violin part has the highest total number of 24 notes. The second violins have the second highest with 17 notes. The violas have the third highest with 15 notes, and the cellos only 12 notes. This pattern is remarkable because the lowest number of notes corresponds with the lowest of the instruments, and this graduated pattern is consistent with each of the string parts. The lower the voice, the fewer the notes.

The next step involved converting these note totals into letters from the alphabet (1 = A, 2 = B, 3 = C, *etc.*). The results of this Letter Number conversion approach are shown

in **Figure 1**. The plaintext solution is LOQX, a phonetic version of *locks*. Elgar employed trick spellings in his correspondence, so such a peculiar spelling is not unprecedented.

Figure 1
Letter Number Forward Conversion of Note Totals for Measures 1 – 6
Violin I: 24 Violin II: 17 Viola: 15 Cello: 12

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z

Why *locks*? Locks come with keys, and so do *ciphers*. Focusing on this idea of keys, the Enigma Theme is performed in the minor and major modes of G. The accidentals for these two contrasting keys are B♭ and E♭ for G minor, and F♯ for G major. The letters for these accidentals provide the initials (E.F.B.) for these covert Principal Theme, *Ein feste Burg* by Martin Luther. The *key* signatures of the Enigma Theme literally furnish the *keys* to unlocking Elgar's melodic vault. This particular cryptogram hinted at by the Locks Cipher is known as the Enigma Keys Cipher.

Returning to the Locks Cipher, when the same note totals are applied to the alphabet in reverse order (i.e., 1 = Z, 2 = Y, 3 = X, *etc.*), the plaintext result is CJLO. When treated as an anagram, these letters may be reshuffled as LOJC. *Lo* is a common biblical term meaning to look, see or behold. It is remarkable *see* sounds like *sea*. Lo is often associated with **behold** as in the phrase 'lo and behold.' JC are the initials for Elgar's secret friend, Jesus Christ. These letters are covertly formed by the Roman numerals of his variation (XIII). X represents 10, and J is the tenth letter of the alphabet. III stands for 3, and C is the third letter. Observe the letter C also sounds like *see* and *sea*. One popular miracle ascribed to Jesus is when he walked on water at the Sea of Galilee, which in reality is a lake (*loch*). LOJC may reasonably be interpreted as *Behold Jesus Christ*.

Figure 2 Letter Number Backward Conversion Note Totals for Measures 1 – 6 *Violin I: 24 Violin II: 17 Viola: 15 Cello: 12*																									
26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z

Some speculate the solution to Elgar's breakout symphonic work, the Enigma Variations, is not a missing melody, but something entirely different like friendship or the number *Pi*. While these nonmusical explanations are not necessarily wrong, they are peripheral to the principal riddle of the Enigma Variations. In 1899 and in the years immediately following, Elgar repeatedly affirmed the Enigma Variations are based on a secret, unstated melody. The first instance comes from a letter he wrote cited by Charles Ainslie Barry in the original 1899 program note for the premiere:

> It is true that I have sketched for their amusement and mine, the idiosyncrasies of fourteen of my friends, not necessarily musicians; but this is a personal matter, and need not have been mentioned publicly. The Variations should stand simply as a 'piece' of music. The Enigma I will not explain – it's 'dark saying' must be left unguessed, and I warn you that the connexion between the Variations and the Theme is often of the slightest texture; further, through and over the whole set another and larger theme 'goes', but is not played…So the principal Theme never appears, even as in some later dramas – e.g., Maeterlinck's 'L'Intruse' and 'Les sept Princesses' – the chief character is never on the stage.[2]

Elgar's description makes clear that "…through and over the whole set [of Variations] another and larger theme 'goes' but is not played…" He captures the core of the conundrum by concluding, "…So the principal Theme never appears..." The context could not be more straightforward because the word *Theme* is capitalized and unambiguously refers to a musical subject. The context demands nothing less than this candid appraisal since it is a program note for a symphony concert. Rather than identify

[2] Original 1899 program note by C. A. Barry citing a letter by Elgar

the opening melody as the *Theme*, Elgar deliberately labels it *Enigma* to capture the mystery of the absent foundational melody.

Any alleged vagueness on this point is quashed by interviews Elgar granted soon after the premiere. The following year he was interviewed by the editor of *The Musical Times,* F.G. Edwards*,* for a biographical sketch featured in the October 1900 issue. Concerning the Enigma Variations Edwards reports:

> In connection with these much discussed Variations, Mr. Elgar tells us that the heading 'Enigma' is justified by the fact that it is possible to add another phrase, which is quite familiar, above the original theme that he has written. What that theme is no one knows except the composer. Thereby hangs the 'Enigma.'[3]

In this context the words *phrase* and *theme* are used interchangeably, again both referring to a melody that may be added *above* the original Enigma Theme. This observation dovetails precisely with the original program note which states "…through and over the whole set another and larger theme 'goes', but is not played…" Only a musical theme can be played, something inconceivable with a symbolic or mathematical one. The article was closely vetted by Elgar and his wife prior to publication, so the lucid description of his melodic enigma is beyond dispute.

There is further corroborating testimony affirming the precise nature of this melodic riddle recorded by Elgar's first biographer, Robert J. Buckley, who closely collaborated with the composer to produce an illuminating biography in 1905. As the music critic for *The Birmingham News,* he first met Elgar in 1896 and knew him for almost a decade prior to publication.[4] In the introduction Buckley confidently declares:

> Whatever this book states as fact may be accepted as such. The sayings of Elgar are recorded in the actual words addressed directly to the writer, and upon these I rely to give to the book an interest it would not otherwise

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[3] *The Musical Times* (October 1, 1900), p. 647

[4] Turner, Patrick. *Elgar's 'Enigma' Variations - a Centenary Celebration.* London: Thames Publishing, 1999, p. 51

possess.[5]

This biography was available during Elgar's lifetime, so it is critical to recognize he never disputed or disavowed any part of Buckley's book. On the subject of the Enigma Variations Buckley writes:

> The 'Enigma' orchestral-piece is Op. 36. What the solution of the 'Enigma' may be, nobody but the composer knows. The theme is a counterpoint on some well-known melody which is never heard, the variations are the theme seen through the personalities of friends, with an intermezzo and a coda, the last added at the request of friends aided and abetted by Dr. Richter, who accepted the work on its merits, having received the score in Vienna from his agent in London, and who at the time had not met with the composer."[6]

Based on three primary sources – Elgar's letter quoted in the 1899 program note, the 1900 interview in *The Musical Times*, and the 1905 biography – four indisputable facts regarding the Enigma Variations are known:

1. The Enigma Theme is a counterpoint to the Principal Theme.
2. The Principal Theme is not heard.
3. The Principal Theme is a melody that can be played 'through and over' the whole set of Variations including the Enigma Theme.
4. The Principal Theme is famous.

Any claims contrary to these conditions may only be made in direct conflict with the recorded words of the composer by multiple, independent, unimpeachable sources. The importance of recognizing these facts is paramount because an astute philosopher once observed, "Getting the question right *is* the answer." In this case that all consuming question must be, "What is the famous, secret melody that plays 'through and over' the Enigma Variations?"

Some Conjectures

Over the past century a panoply of tunes have been proposed as the melodic solution to the Enigma Variations. Among the most debated are:

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[5] Buckley, Robert J. *Sir Edward Elgar (1905).* New York: Kessinger Publishing, Llc, 2009, p. xi

[6] *Ibid*, p. 54-55

1. *Auld Lang Syne*
2. *Pop goes the Weasel*
3. *For He's a Jolly Good Fellow*
4. *Twinkle, Twinkle Little Star*
5. Beethoven's *Pathétique* Piano Sonata
6. *Now the Day is Over*
7. The *Andante* from Mozart's Prague Symphony
8. *God Save the King*
9. *Rule Britannia*
10. The *Dies Irae*
11. The *Tallis Canon*

A fatal flaw endemic to all of these purported solutions is when they are played 'through and over' the Enigma Theme they fail to achieve a precise horizontal fit. This outcome is only realized when the Covert Theme and the Enigma Theme begin and end together, completing only one cycle concurrently. Equally problematic is these alleged solutions invariably produce an unacceptably high number of dissonant intervals with the Enigma Theme that betrays the absence of a credible counterpoint. In no case with these alleged solutions has there ever been established any cryptographic links with the Enigma Theme or any of the ensuing movements. Vain attempts at incomplete melodic mappings over the Enigma Theme only confirm what is revealed by the dearth of supporting cryptographic evidence. Following a century of dogged sleuthing, the melodic solution has yet to be discovered and authenticated by any cryptograms embedded within the Enigma Variations.

A New Solution

Over In February 2009 a new candidate melody was first proposed: *Ein feste Burg* (A Mighty Fortress) by Martin Luther. While it is entirely plausible *Ein feste Burg* may be the covert Principal Theme to the Enigma Variations, plausibility is not the same as proof. The real question is whether there is some way to decisively prove it. Absent confirmation, no solution has any hope of venturing beyond the purely speculative. This

inevitably raises the question whether Elgar surreptitiously supplied some way to authenticate the correct solution. Short of discovering a sealed envelope with the answer written in the composer's own script, the consensus is a resounding no. Most scholars agree the riddle is impossible to decisively solve because Elgar ostensibly took his secret to the grave. The conventional wisdom is captured by the late Michael Kennedy who surmised, "People have ingeniously been trying to guess the tune ever since, a harmless but pointless recreation since the secret, if there was one, died with him."[7] J.P.E. Harper-Scott echoes this staid opinion:

> Although human nature guarantees that attempts to solve it will never end until the Ark of the Covenant and the Holy Grail are on permanent display in the British Museum, they all somehow fail to convince. It is easy to carp, since the riddle cannot be answered now its perpetrator is dead, but the evidence supporting all of the 'solutions' is weak.[8]

By dismissing the possibility of discovery, these career academics conveniently alleviate themselves of the seemingly insurmountable task of searching for the solution. Since they appear unwilling to unmask it, academics categorically deny that possibility for everyone else. If they cannot unravel this melodic Gordian knot, they reason nobody else can or should. Elgar was suspicious of career academics, balked when invited to join their ranks, and abandoned his lectures after enduring their pedestrian and often pedantic criticisms. It should come as no surprise that the correct solution to the Enigma Variations would stubbornly elude discovery by career academics who in so many ways are the antithesis of Elgar, an autodidact who never attended university.

A Puzzling Personality

A character study of Elgar makes abundantly clear he held a lifelong fascination for a diverse range of puzzles like anagrams, crossword puzzles, riddles, and ciphers. His musical scores and letters are peppered with anagrams and secret codes. The name he chose for his only child was *Carice* derived from his wife's name (**Ca**roline Al**ice**). In

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[7] Kennedy, M. (2004). *The Life of Elgar.* New York: Cambridge University Press. p. 67

[8] Harper-Scott, J. P. (2007). *Elgar: An extraordinary life.* Dorking: Associated Board Of The Royal School Of Music, p. 49

March 1899 he named his new home Craeg Lea, a clever anagram constructed by reversing the letters of his last name (C**rae**g **Le**a), and inserting the first letters of the first names of his daughter, wife, and himself (**C**arice**, A**lice, **E**dward).[9] The initials C.A.E. represent his wife in the Enigma Variations, a work completed only a month prior to relocating to Craeg Lea. He later created the palindrome *Siromoris* to serve as his telegraphic address, a name based on his two honors – a knighthood and the Order of Merit. In correspondence he used this name as well as the opening bars of the *Enigma* theme to represent himself. Since he wrote the Enigma Theme, this self-identification is self-evident.

Elgar's keen interest in ciphers is well known, well established, and well beyond doubt. In April 1886 he attended a performance at the Crystal Palace conducted by August Manns in honor of Franz Listz who was present for the occasion. Elgar expressed his opinion of the performance by writing a message in cipher on his program. It was later decoded as "Gets you to joy, and hysterious." According to Jerrold Northrop Moore, the word "hysterious" is a portmanteau based on the words *hysteria*, *mysterious*, and *tear*.[10]

In July 1897, Elgar sent a coded letter to Dora Penny who would later became the "variationee" for Variation X with the nickname *Dorabella*. This coded message is known as the Dorabella Cipher, and it is among the most famous puzzles in cryptography because it remained unbroken for over a century.[11] After some remarkable investigative work, Tim Roberts successfully solved the Dorabella Cipher in 2009.[12] His groundbreaking research confirmed Elgar employed multiple languages with some phonetic spellings to harden the cipher against easy decryption. In Buckley's 1905 biography, Elgar describes how he amused himself with cryptograms on railway journeys, and solved an allegedly unbreakable cipher by John Holt Schooling featured in

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[9] Kennedy, M. (2004). *The Life of Elgar.* New York: Cambridge University Press. p. 66.

[10] Moore, J. N. (1999). *Edward Elgar: A Creative Life* (Clarendon Paperbacks) (New Ed.). New York: Oxford University Press, USA, p. 114.

[11] Kahn, David. *The Code Breakers.* New York: The Macmillan Company, 1968, p. 800.

[12] http://unsolvedproblems.org/S36b.pdf

an 1896 issue of *The Pall Mall Gazette.*[13] He was so pleased with this discovery he painted the solution on a wooden box using black paint. This box is now in the possession of the Elgar Birthplace Museum. A box is ideal for displaying the solution because it is a *Nihilist* cipher, also known as a checkerboard cipher due to its grid pattern of cells arranged in columns and rows.

The fundamental allure of any puzzle is the prospect of solving it. Cryptograms were to Elgar what Mount Everest is to a mountain climber. He delighted in tackling supposedly insoluble puzzles, and created a famous pair of his own with the Dorabella Cipher and Enigma Variations. One of his greatest and most elaborate puzzles, the Enigma Variations were obviously formed with the intent of concealing a melodic solution. The composer's public and private remarks on this subject make that point overwhelmingly clear. Elgar did not take his secret to the grave as some scholars would have us naively believe. On the contrary, he ingeniously enciphered the answer in the orchestral score. When found the solution would be *unguessed* just as the original program note explains because it would be exposed by means of one of the composer's principal forms of amusement – *cryptanalysis*.

Some Basic Ciphers

To crack Elgar's music Enigma Cipher, it was first necessary to locate the key to unlock it. Multiple lines of cipher evidence point to *Ein feste Burg* as the mysterious missing melody. The most elementary one concerns the keys in which the Enigma Theme is performed, namely the major and minor modes of G. The accidentals for these two contrasting keys are B♭ and E♭ for G minor, and F♯ for G major. The letters for these accidentals are the initials for *Ein feste Burg*, E.F.B. The *key* signatures of the Enigma Theme literally furnish the *keys* to unlocking Elgar's melodic vault. This particular cryptogram is known as the Enigma Keys Cipher.

How is it possible to know the initials E.F.B. stand for *Ein feste Burg*? Further clarifying information is given by a slightly more complex cipher nestled among the

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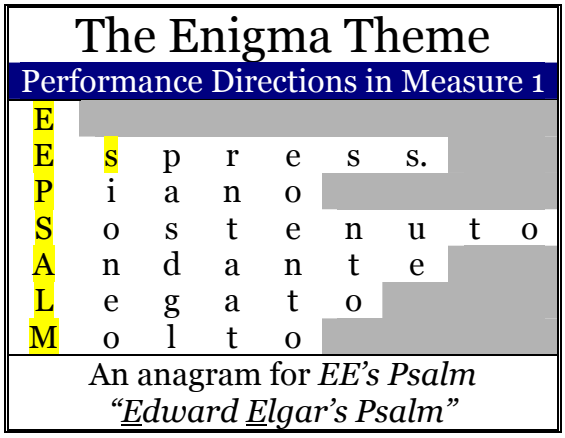
[13] Buckley, Robert J. (1905). *Sir Edward Elgar).* New York: Kessinger Publishing, Llc, 2009, p. 41.

Performance Directions in the first measure of the Enigma Theme. In this first bar there are seven discreet performance directions: *Andante*, *molto espressivo*, *Piano*, *legato e sostenuto*. The first letters of these seemingly unremarkable Performance Directions situated in the first measure form the ingenious anagram EE's PSALM. The initials EE obviously stand for the composer, Edward Elgar. The word *Psalm* points to the book of *Psalms* in the Old Testament Bible which has 150 chapters. This furnishes a numerological parallel with the Enigma Variations which it is comprised of 15 movements, the Enigma Theme followed by fourteen variations.



Since the word *psalm* is in the singular case, this cipher singles out only one of those chapters. But which one? The Ternary ABA Structure of the Enigma Theme conveniently encodes the correct number. The opening A Section in G minor is 6 measures followed by the contrasting B section in G major which is 4 measures. Pairing these two numbers together creates the natural number 46. It is from Psalm 46 that Martin Luther drew the title and inspiration for his most epic hymn, *Ein feste Burg*. The Performance Directions Anagram Cipher identifies the correct book from the Old Testament (Psalms), and the number of measures in the A and B sections of the Ternary structure specify the chapter (46). The biblical source of the melodic solution is intimated by Elgar's use of Old Testament names for the titles of Variations VI (*Ysobel*) and IX (*Nimrod*).

These two relatively basic Enigma Theme ciphers implicate *Ein feste Burg* as the covert Principal Theme. This solution accounts for the seemingly anomalous Mendelssohn fragments quoted in Variation XIII since Mendelssohn quotes *Ein feste*

Burg in his first extended symphonic work, the Reformation Symphony. By quoting Mendelssohn, Elgar subtly suggests by inversion (a common contrapuntal technique) that Mendelssohn also quotes the same Principal Theme in one of his own works. The number of Mendelssohn fragments – four – cleverly specifies the correct movement from the Reformation Symphony that cites *Ein feste Burg* – the fourth.

Finding and Decoding Elgar's "Dark Saying"

Armed with the title of the absent Principal Theme, the next step was to find the lock, insert the key, and unlock the contents of Elgar's mysterious "dark saying." But where was that lock? Where was the location of this enigmatic music cipher? The first six measures of the Enigma Theme appeared to be the most obvious place to begin the search due to the odd placement of a double bar at the end of measure 6 (Figure 1). A double bar is commonly used to denote the end of a movement or a section, but neither was evidently the case here. The Enigma Theme is seventeen measures in length, and the placement of a double bar so close to the beginning is highly conspicuous. It was reasoned Elgar inserted a double bar in measure 6 to demarcate not the close of a section, but the end of a cipher.

There is an array of preternatural coincidences supporting the hypothesis that the first six measures of the Enigma theme is indeed a music cipher. First, the total number of letters in the title *Ein feste Burg ist unser Gott* is the same as the number of melody notes played over the first six bars: 24. Second, the number of measures is identical to the number of words in the missing melody's complete title: 6. Third, there is an audible sense of separation achieved by the systematic placement of quarter note rests in the melody line at the beginning of each bar, a device suggestive of spaces between words. Dr. McClelland perceptively observes:

> Elgar's six-bar phrase is achieved by the characteristic four-note grouping, repeated six times with its reversible rhythm of two quavers and two crotchets. This strongly suggests the cryptological technique of disguising

word-lengths in ciphers by arranging letters in regular patterns.[14]

Fourth, the original short score lends compelling circumstantial evidence for a music cipher in the first six bars of the Enigma Theme because the melody and bass notes are in black ink while the intervening notes are in pencil.[15] This presents a highly suggestive parallel with Elgar's solution to the John Holt Schooling's Nihilist cipher which was painted on a wooden box with *black* paint. Fifth, at least three of Elgar's favorite composers included music ciphers in their scores: J.S. Bach, Robert Schumann, and Franz Listz. In the unfinished Contrapunctus 14 of *Die Kunst der Fuge (The Art of Fugue)*, Bach inserts his own name using the notes B♭, A, C and B. In the German musical nomenclature, B♭ is represented by B, and B natural by the letter H. In Schumann's *Nordische Lied*, he transforms the name of a Danish contemporary, Gade, into a musical motive, and in his Op. 60 fugues, he manipulates the Bach motive using inversion, retrograde, and augmentation.[16] In *The Dream of Gerontius* Op. 38, a work completed shortly after the Enigma Variations, Elgar encodes the names of some of his critics in the Demons' Chorus with a music cipher. Like Schumann's work for Gade, Elgar composed an Allegretto for the Gedge sisters using the letters of their name as a musical motive.[17] Finally, the original score has the word *Enigma* centered directly over the first six bars, marking the precise location of the cipher and its "dark saying." As other researchers point out, the phrase "dark saying" is one of the definitions for *enigma*.[18] The first word from the covert Principal Theme's title (*Ein)* is found in the first three letters of *Enigma* with its last letter providing the correct translation (A). All the available evidence points to the first six bars of the Enigma Theme as the most likely location of a music cipher. The presence of the Keys and Performance Anagram ciphers

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[14] McClelland, C. (2007, Winter). *Shadows of the evening: new light on Elgar's 'dark saying'.* Music Times, Winter , p. 44.

[15] London British Library Add. MS 58003, f.2v.

[16] Daverio, J. (2008). *Crossing Paths: Schubert, Schumann, and Brahms.* New York: Oxford University Press, USA, p. 101.

[17] McVeagh, D. (2007). *Elgar the Music Maker.* Rochester, NY: Boydell Press, p. 3.

[18] Turner, Patrick. *Elgar's 'Enigma' Variations - a Centenary Celebration.* London: Thames Publishing, 1999, p. 46

only bolsters this suspicion.

To assess the presence of a music cipher, a frequency analysis was first performed on the letters from the complete title of *Ein feste Burg* (Table 1). The results show there are a total of 24 letters with 11 distinct types.

Table 1

Letter Frequencies for *Ein feste Burg ist unser Gott*

Letter	***Frequency***
e	4
t	4
s	3
g	2
i	2
n	2
r	2
u	2
b	1
f	1
o	1
11 distinct letters	24 occurrences

These results were carefully compared with the first 24 notes in the Enigma Theme based on note letters and durations (Table 2).

Table 2

Note Frequency Chart
Enigma Theme (Measures 1-6)

Note	***Frequency***	***Duration***	
		Quarter	*Eighth*
A	6	2	4
B♭	6	3	3
C	2	1	1
D	3	2	1
F	1	1	0
G	7	3	4
6 Distinct Notes	24 Occurrences	12 Total	12 Total

Extensive experimentation with strict substitution ciphers in which one plaintext letter is matched with each note type yielded no meaningful results. This was an expected outcome because it was also encountered by other researchers. For Elgar to employ such an elementary cipher would be too easy to unravel, so something more sophisticated should be expected. Were there other more complex cipher methods known to Elgar at the time he composed the Enigma Variations?

Eric Sams theorized Robert Schumann learned about an assortment of music ciphers from a book in his father's bookstore by Ludwig Klübner called *Kryptographik* (1809).[19] One method Klübner describes is a sophisticated music cipher wheel that encodes single plaintext letters using two note combinations.[20] Schumann was one of Elgar's favorite composers and was known to employ music ciphers in his works. Recognizing the significance of Klübner's music cipher wheel, an analysis of melodic note pairs in the Enigma melody was performed. However, this proved just as unproductive as the strict substitution method. Further attempts at decryption using a variety of cipher methods yielded no momentous results over a three month period. 373 days after I first concluded *Ein feste Burg* was the covert Principal Theme, I experience an epiphany: Two note combinations were possible, but it was necessary to consider the melody and bass notes together for the complete cipher. These are the same notes written in *black ink* on the original short score – Elgar's "dark saying."

The coupling of melody and bass notes was strongly suggested by Elgar's use of six note letters in the melody (i.e., A, B, C, D, F & G), and six in the bass (A, B, C, D, E & G). Together the melody and bass lines employ all seven note letters with the only discrepancy between E and F. Later analysis revealed these notes were combined just as *i* and *j* or *u* and *v* are conflated when enciphering entire alphabetical sequences. Robert Schumann (one of Elgar's 'ideal' composers) used the notes E and F in his music ciphers

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[19] Sams, Eric. *Did Schumann use ciphers?* London, The Music Times, Aug., (1965), p. 584-591

[20] Daverio, John. *Crossing Paths: Schubert, Schumann, and Brahms.* New York: Oxford University Press, USA, 2008, p. 83.

to symbolize his alter egos, Eusebius and Florestan. [21] With the conflation of the notes E and F, one distinct melody note may be assigned to each column, and one discrete bass note given to each row. This arrangement produces a 6 x 6 checkerboard configuration. By pairing a melody note with a bass note, a single cell in the checkerboard grid is designated at their intersection containing a plaintext letter solution.

There is yet another basis to suspect Elgar constructed a 6 x 6 checkerboard cipher because there are precisely six different 6-letter names and titles used in the Enigma Variations:

1. *Enigma* for the Theme
2. *Ysobel* for Variation VI
3. *Troyte* for Variation VII
4. *Nimrod* for Variation IX
5. *Eduard* from the initials E.D.U. assigned to Variation XIV which are the first three letters of the German translation of Edward
6. *Finale*, the subtitle for Variation XIV

The next step in the decryption process was to map out the bass/melody note pairs in the first six bars of Enigma Theme and compare them with the letter frequencies of *Ein feste Burg* (Table 3). For the purpose of identifying note pairings, each bass quarter note was treated as a half note. These base line extensions from the original quarter notes are justified based on the recapitulation of the opening six bars in measures 11 through 16 where they are played continuously as half notes (Figure 1). Bass notes not sounding continuously but implied by this analysis are shown in parentheses. In hindsight, Elgar's decision to limit the majority of the bass notes to quarter notes in the opening six bars appears to be a stratagem for obscuring the cipher.

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[21] Dowley, T. (1982). *Schumann: His Life and Times*. Neptune City, NJ: Paganiniana Publications, Inc., p. 46-47.

Table 3			
Summary of Bass-Melody Note Pairs In the Enigma Theme (Measures 1-6)			
Quarter Notes		***Eighth Notes***	
Bass	*Melody*	*Bass*	*Melody*
A	C	C	A
A	A	C	C
B♭	D	C	A
B	F	C	B♭
C	B♭	C	A
C	G	C	G
C	G	C♯	A
D	D	C♯	G
D	B♭	D	B♭
E♭	G	D	D
E♭	A	G	B♭
E♭	B♭	G	G

Unmistakable correlations were found between bass/melody note pairings and plaintext letter frequencies (Table 4). Discernable bass-melody note pairings were easily identified for letters with frequencies of 4 (e and t), 3 (s), and in three cases with letters with frequencies of 2 (g, i, n, r and u). The remaining two bass/melody pairings for letters with frequencies of 2 were not immediately apparent. The first to be paired were B♭/G and D/B♭ because together they form a G minor triad, the opening chord of the *Enigma* theme. Also, they share a common note in reverse positions (B♭). The final match pair was found to be A/C and E♭/A because of the shared note in reverse positions (A) as was the case with the previous pairing. A more nuanced explanation is the letters A, C and E are the initials for the first names of Elgar, his wife and daughter. Like the previous match pair, these notes form a music triad. The remaining three bass/melody pairs (B/F, E♭/G, and E♭/B♭) were assigned to letters with single frequencies (b, f and o).

Table 4				
Possible Letter Solutions for Bass-Melody Note Pairs within the Enigma Theme (Measures 1-6)				
Bass	***Note Value***	***Melody***	***Solutions***	***Frequency***
C♯	Eighth	G	e, t	Four
C	Eighth	G	e, t	
C	Quarter	G	e, t	
C	Quarter	G	e, t	
C	Eighth	A	e, t	Four
C	Eighth	A	e, t	
C	Eighth	A	e, t	
C♯	Eighth	A	e, t	
A	Quarter	A	s	Three
C	Eighth	C	s	
G	Eighth	G	s	
C	Eighth	B♭	g, i, n, r, u	Two
C	Quarter	B♭	g, i, n, r, u	
D	Eighth	B♭	g, i, n, r, u	Two
D	Quarter	B♭	g, i, n, r, u	
D	Eighth	D	g, i, n, r, u	Two
D	Quarter	D	g, i, n, r, u	
B♭	Quarter	D	g, i, n, r, u	Two
G	Eighth	B♭	g, i, n, r, u	
A	Quarter	C	g, i, n, r, u	Two
E♭	Quarter	A	g, i, n, r, u	
B	Quarter	F	b, f, o	One
E♭	Quarter	G	b, f, o	One
E♭	Quarter	B♭	b, f, o	One

After testing all possible plaintext letter solutions restricted by bass/melody note frequency pairings over the first 6 bars of the *Enigma* theme, an outcome that can only be described as extraordinary is realized (Table 5).

Table 5

The Enigma Theme (Measures 1-6)
Music Box Cipher Solution Text

Measure	*Bass*	*Value*	*Melody*	*Solution*	
1	G	Quarter	Rest		Rhythmic Palindrome 1
	(G)	Eighth	B♭	**g**	
	(G)	Eighth	G	**s**	
	A	Quarter	C	**u**	
	(A)	Quarter	A	**s**	
2	B♭	Quarter	Rest		
	(B♭)	Quarter	D	**g**	
	C	Quarter	B♭	**r**	
	(C)	Eighth	A	**t**	
	(C)	Eighth	C	**s**	
3	D	Quarter	Rest		Rhythmic Palindrome 2
	(D)	Eighth	B♭	**i**	
	(D)	Eighth	D	**n**	
	E♭	Quarter	G	**o**	
	(E♭)	Quarter	A	**u**	
4	B	Quarter	Rest		
	B	Quarter	F	**b**	
	C	Quarter	G	**e**	
	(C)	Eighth	A	**t**	
	(C)	Eighth	B♭	**r**	
5	C♯	Quarter	Rest		Rhythmic Palindrome 3
	(C♯)	Eighth	A	***t***	
	(C♯)	Eighth	G	***e***	
	D	Quarter	D	***n***	
	(D)	Quarter	B♭	***i***	
6	E♭	Quarter	Rest		
	E♭	Quarter	B♭	***f***	
	C	Quarter	G	***e***	
	C	Eighth	A	***t***	
	C	Eighth	G	***e***	

Measure 1: GSUS

In measure 1 the plaintext solution is *gsus*, a phonetic spelling for Jesus. This special friend according to Elgar's Roman Catholic faith is the hidden dedicatee for Variation XIII. His initials are ingeniously encoded by the Roman numerals for this movement. X

represents the number ten, and the tenth letter in the alphabet is J. III stands for the number three, and the third letter in the alphabet is C. When the Roman numerals XIII are converted into letters using this Letter Number cipher method, the initials J.C. are realized. The efficacy of this cipher is demonstrated by Variation IX (Nimrod) dedicated to Elgar's German friend, August Jaeger. Applying the same Letter Number encryption method to the Roman Numerals IX produce the initials A.J.

Richard Santa discovered Elgar encoded *Pi* in the opening measure of the Enigma Theme. Pi is a mathematical constant describing the ratio between any circle's circumference and its diameter. In his groundbreaking research, Santa observed the first four notes of the Enigma Theme sequentially approximate the number *Pi* by means of scale degrees (i.e., B flat = 3, G = 1, C = 4, A = 2). The pairing of *Pi* with Jesus in the first measure of the Enigma Theme intimates the phrase "Pie Jesu" (Pious Jesus), a phrase from the final couplet of the *Dies irae*, a hymn in the Roman Catholic Requiem Mass.

Measure 2: GRTS

In measure 2 the plaintext solution is *grts*, the phonetic spelling of the Latin words *gratus*, *gratis*, and *gratias*. In his youth Elgar attended three Catholic schools where he received extensive instruction in Latin, so he was very familiar with this academic and liturgical language. According to Cassell's Latin Dictionary, *gratus* means "pleasing, welcome, agreeable" and "loved".[22] *A Copious and Critical English-Latin Dictionary* first published in 1871 and still in use when Elgar composed the Enigma Variations defines *gratus* as "beloved" and "favorite".[23] The terms "beloved" and "pleasing" are used in reference to Jesus after his baptism when a voice from heaven said, "You are my beloved Son; with you I am well pleased."[24]

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[22] *Cassell's Latin Dictionary* (5th ed.). (2000). New York: Continuum, p. 268

[23] Hall, W., & Smith, T. (1871). *A Copious and Critical English-Latin Dictionary.* New York: American Book Co., p.

[24] English Standard Version

An alternative realization of the plaintext *grts* is the Latin word for grace – *gratis*. As an adverb it is defined as "without recompense, for nothing, gratis."[25] As a noun *gratis* means "thanks" or "thanksgiving," especially to a deity. The phrase "Jesus Gratias" means "Thanks be to Jesus," and closely mirrors a phrase from the Latin mass "Deo Gratias" which means "Thanks be to God." The alternative spelling "gratias" appears in the Ordinary of the Latin Mass in the seventh sentence of the *Gloria* as, "Gratias agimus tibi propter magnam gloriam tuam" ('We give thee thanks for thy great glory').[26] Following the first measure's reference to Jesus, the appearance of the Latin words for beloved, thanksgiving, and grace are theologically elegant and compelling. In the Christian canon Jesus is described as beloved and pleasing to God, and serves as the supreme example of divine grace. This message is made plain in the book of Ephesians that states, "For it is by grace you have been saved, through faith—and this not from yourselves, it is the gift of God— not by works, so that no one can boast."[27]

Measures 3 and 4: INOU BETR

In measure 3 the plaintext solution is *inou*, a phonetic rendering of the phrase "I know you." In measure 4 the plaintext solution is *betr*, a phonetic version of the word "better." Combing the plaintext results for measures three and four generates the phrase "I know you better". The formation of a meaningful phrase based on the plaintext solutions from bars 3 and 4 ("I know you better") mirrors the pattern of producing a cogent phrase from the plaintext results from measures one and two ("Jesus Gratias" translated as "Thanks be to Jesus"). Following the plaintext results from measures 1 and 2 citing Jesus and some of his attributes, the phrase definitely implies Elgar knows Jesus better. But what possible explanation is there for why Elgar would encode such a declaration?

Almost five months before Elgar began openly working on the Enigma Variations, Secondo Pia took the first official photographs of the Turin Shroud. The photographic

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[25] *Cassell's Latin Dictionary* (5th ed.). (2000). New York: Continuum, p. 267-268.

[26] Randel, D. M. (1986). *The New Harvard Dictionary of Music* (Harvard University Press Reference Library). Cambridge: Belknap Press, p. 471-472

[27] Ephesians 2:8-9 *NIV*

negative taken on May 28, 1898, vividly revealed for the first time the crucified body and face of the man many fervently believe to be Jesus Christ. It quickly became an international sensation, deluging the pages of both the secular and religious press. Copies of that remarkable image were soon shared and revered among Roman Catholics around the globe. For the first time many beheld the face of their Lord and Savior. For a Roman Catholic like Elgar, the phrase "I know you better" conveys their view of the Holy Shroud's significance and meaning. Elgar said if the Enigma Theme were presented as a ballet, the Enigma should be represented by a *veiled* dancer in a banquet hall. Like a shroud, a veil a cloth used to cover the body. Shortly before his crucifixion, Jesus met with his *twelve* disciples in a banquet hall to celebrate the Last Super. Excluding Elgar and his wife, there are *twelve* friends portrayed in the Variations. None of these theological allusions could ever be expected to register in a secular scholar's worldview. In contrast, Elgar's *weltanshauung* at the time he composed the Enigma Variations was decidedly Roman Catholic.

Measure 5: TENI

In measure 5 the plaintext solution is *teni*, an Aramaic word used by Jesus when he encountered the Samaritan woman at Jacob's well. When she came to the well to draw water, the first thing Jesus said to her was, "Teni li listosh," which means, "Give me [something] to drink."[28] It was during this exchange that Jesus revealed his identity as the Messiah. In view of the plaintext results in measures 1 through 4, this theological assessment of *teni* is amply justified. This conclusion is bolstered by the recognition Elgar's personal library contained numerous works on theology and biblical exegesis.

Measure 6: FETE

In Measure 6 the plaintext solution is *fete*, a word defined as a lavish party or religious festival. In light of the coded reference to Jesus in measure 1, the latter definition involving a religious context is warranted.

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[28] Edersheim, A. (1896) *The Life and Times of Jesus The Messiah Volume 1*. New York, NY: Longmans, Green, and Co, p. 410

Table 6

Enigma Theme Measures 1 through 6
Music Box Cipher Solution Text and Translation

Measure	*Bass*	*Value*	*Melody*	*Solution*	*Translation*
1	G	Quarter	Rest		<u>English</u> Phonetic for *Jesus,* the secret friend and inspiration portrayed in Variation XIII *Romanza*
	(G)	Eighth	B♭	***g***	
	(G)	Eighth	G	***s***	
	A	Quarter	C	***u***	
	(A)	Quarter	A	***s***	
2	B♭	Quarter	Rest		<u>Latin</u> Phonetic for three Latin terms: 1. *Gratias* – Thanks be to 2. *Gratis* – Grace, for free 3. *Gratus* – Beloved
	(B♭)	Quarter	D	***g***	
	C	Quarter	B♭	**r**	
	(C)	Eighth	A	**t**	
	(C)	Eighth	C	**s**	

The plaintext results for measures 1 and 2 *(gsus grts)* are translatable in three ways, producing a *trinity* of meanings:

I. *Thanks be to Jesus* (see 1 Timothy 1:12)
II. *Jesus, Beloved* (see Matthew 3:17, Luke 3:22)
III. *Jesus, Grace* (see John 1:17, Acts 15:11, Romans 1:17)

3	D	Quarter	Rest		<u>English</u> Phonetic for *I know you*
	(D)	Eighth	B♭	***i***	
	(D)	Eighth	D	***n***	
	E♭	Quarter	G	***o***	
	(E♭)	Quarter	A	***u***	
4	B	Quarter	Rest		<u>English</u> Phonetic for *better*
	B	Quarter	F	***b***	
	C	Quarter	G	***e***	
	(C)	Eighth	A	***t***	
	(C)	Eighth	B♭	***r***	

The plaintext results for measures 3 and 4 *(inou betr)* form the English phrase *I know you better* (see Matthew 11:27, John 14:6-7). Elgar implies he knows Jesus better.

5	C♯	Quarter	Rest		<u>Aramaic</u> This was a primary language spoken by Jesus. *Teni* can mean to hand down orally or to teach.
	(C♯)	Eighth	A	***t***	
	(C♯)	Eighth	G	***e***	
	D	Quarter	D	***n***	
	(D)	Quarter	B♭	***i***	

When Jesus met the Samaritan woman at the well (John 4:7), he said to her in Aramaic, *"Teni li listosh" (Give me to drink).* Elgar's use of *teni* alludes to this well known exchange, suggesting he is asking his secret friend – the Living Water – for something to drink.

6	E♭	Quarter	Rest		<u>English</u> *Fete* means a lavish party or religious festival (feast). At the Last Supper Jesus instituted the New Covenant symbols of the bread and wine (Eucharist).
	E♭	Quarter	B♭	*f*	
	C	Quarter	G	*e*	
	C	Eighth	A	*t*	
	C	Eighth	G	*e*	

The use of phonetic spellings is a diabolically difficult device that vastly complicates decryption, particularly when done with multiple languages encoded in the same message. Elgar's personal correspondence is rife with trick spellings as Eric Sams meticulously mentions with "excuse" spelled as "xqqq", and "score" as "ckor", "skore", "skorh", "skowre", "skourrghe", "csquorr", "skourghowore", and "ssczowoughohr".[29] Even if such a cipher were compromised, the outcome would still not easily reveal the title of the missing melody since it is anagrammatized. The enigma is therefore multilayered because the solution letters must be rearranged to spell out the correct solution. With 24 letters in the title of the missing melody, a minimum of 41,667 six word combinations in English are possible with correctly spelled words. When phonetic spellings and multiple languages are added to the mix, the pool of potential outcomes expands exponentially.

Akin to the four sides of a box cipher key or four instruments in a string quartet, there are four languages employed in Elgar's Enigma Theme Music Box Cipher: English, Latin, German and Aramaic. Similar to the Enigma Theme Performance Directions Anagram Cipher in which Elgar encodes his initials (E.E.), the first letters of these cipher languages spell out the composer's last name:

- English
- Latin
- German
- ARamaic

Elgar literally signed his cipher so it could be independently authenticated as genuine and correct. The phonetically spelled words and phrases from Elgar's 'dark saying' are an elaborate anagram sourced from the title of the unstated Principal Theme, *Ein feste Burg ist unser Gott*. Such an incredible outcome could only be the result of a deliberate, premeditated plan, one far beyond my powers of invention. To suggest any other

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[29] Cited from an unpublished paper by Eric Sams entitled *Elgar's Cipher Table* (1970-71).

explanation, particularly one devoid of forethought and careful planning by Elgar, would be patently absurd.

The Enigma Music Box Cipher key is summarized in Table 7. It is comprised of a 6 x 6 checkerboard, an intriguing outcome when one realizes the opus number for the Enigma Variations is 36, namely the product of 6 x 6. Plaintext letters are shown while null cells contain only asterisks, although it would be simple enough to fill in the null cells with any combination of letters. To find a solution letter, locate the intersection of the melody and bass notes as outlined in Table 3. For instance, the combination of the melody note A with the bass note C yields the plaintext letter *t.* Given the size of the grid, multiple pairings are possible for the same letter, furnishing another effective means to confuse attempts at unraveling the cipher. It should be emphasized Elgar did not provide homophones for the letter *e*, but did so for letters typically having lower frequencies such as *g* and *s*. This practice is also another proven method for sowing confusion and defeating attempts at cracking a cipher. That Elgar closely studied an allegedly unbreakable *Nihilist* cipher in the 1896 series of *The Pall Mall Magazine* – two years before he composed the *Enigma Variations* and one year before he created his still unsolved *Dorabella* cipher – is particularly relevant to this discovery. It may be worthwhile to investigate whether a variant of the Polybius square served as the basis for encrypting the *Dorabella* cipher assuming it consists of an even number of characters.

Table 7

The Enigma Theme
Music Box Cipher Key

Notes		MELODY					
		A	***B***	***C***	***D***	***E F***	***G***
BASS	***A***	s	-	u	-	-	-
	B	-	-	-	g	b	-
	C	t	r	s	-	-	e
	D	-	i	-	n	-	-
	E F	u	f	-	-	-	o
	G	-	g	-	-	-	s

A dash (-) denotes a null

There was a far more compelling reason to suspect Elgar was inspired to create a musical Polybius square, although I was unaware of it until only after my discovery of the his Music Box Cipher. In his personal library are four articles from the 1896 edition of *The Pall Mall Gazette* titled *Secrets in Cipher*. These papers are now in the possession of the Elgar Birthplace Museum. The third article contains a music cipher from the era of George II showing how twelve quarter notes and twelve eighth notes were used to encipher 24 letters of the English alphabet. In a remarkable parallel, Elgar employs exactly twelve quarter notes and twelve eighth notes in the first six bars of the Enigma Theme. The fourth article presents an allegedly insoluble *Nihilist* cipher Elgar reports solving in his 1905 biography.[30] The Nihilist cipher is a variant of the Polybius square and in some versions is in the form of a 6 x 6 grid "…to accommodate the 35 letters of the old Russian alphabet."[31] The suspicion Elgar devised a 6 x 6 checkerboard cipher was bolstered retroactively by the revelation of these articles from *The Pall Mall Gazette*. David Kahn reports the ancient Greek Polybius originally invented the checkerboard as a signaling method to relay messages over long distances at night using torches.[32] Elgar's cryptic reference to a "dark saying" takes on a whole new light in this context. The Polybius square is a very old cipher, one Elgar knew intimately from his personal studies.

Conclusion

Contrary to the popular wisdom, Elgar did indeed write down the solution to his Enigma Variations while he was very much alive, accomplishing this feat in the opening six bars of the Enigma Theme by means of an ingenious music checkerboard cipher. With the answer hidden in plain sight, Elgar evokes the words of Jesus who asked his disciples, "Do you have eyes but fail to see, and ears but fail to hear?"[33] For over a century the solution has been seen and heard countless times, yet ironically those with eyes and ears failed to recognize it. Such is the pinnacle of the art of cryptography, a

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[30] Buckley, Robert J. *Sir Edward Elgar (1905).* New York: Kessinger Publishing, Llc, 2009, p. 41.

[31] Kahn, David. *The Code Breakers.* New York: The Macmillan Company, 1968, p. 620.

[32] *Ibid*, p. 83.

[33] Mark 8:18 *(NIV)*

discipline Elgar found irresistible throughout his life. Now we know with certainty the secret he allegedly took to his grave. The covert Principal Theme to the Enigma Variations is Martin Luther's famous hymn *Ein feste Burg ist unser Gott*. This astonishing cipher discovery gives rise to the following question for J.P.E. Harper-Scott: When will the Ark of the Covenant and the Holy Grail go on permanent display at the British Museum?

About the Author

Mr. Padgett teaches violin, viola and piano at his private studio in Plano, a suburb of Dallas, Texas. In 2008 he won the Max Bragado-Darman Fanfare Competition with his original work *Fanfare for the Eagles* composed in honor of the Apollo 11 astronauts. Mr. Padgett was born on July 20, 1969 – the same day the astronauts first set foot on the moon. *Fanfare for the Eagles* was premiered by the Monterey Symphony in May 2008 under the direction of Max Bragado-Darman. Mr. Padgett's original compositions have been performed at the Bohemian Grove, the Bohemian Club in San Francisco, and other private and public venues.

In addition to being a music instructor and composer, Mr. Padgett is a professional musician who has performed for Prince Charles, Lady Camilla, Arnold Schwarzenegger, Maria Shriver, Steve Jobs, Van Cliburn, Joseph Silverstein, Efrem Zimbalist III, author and music critic Marcia Davenport, Pat Sajak, George and Charlotte Shultz, Vinnie Falcone, Shelly Berg, Nolan Gasser and Robert Trent Jones Jr. II.

Mr. Padgett studied violin with Michael Rosenker, Associate Concertmaster of the New York Philharmonic and a student of Leopold Auer. He also studied with Rosenker's pupil, Owen Dunsford. As a sophomore in high school, he joined the Monterey County Symphony as a sectional violinist and performed under the direction of Haymo Taeuber, Clark Suttle, Max Bragado-Darman and Arthur Post. As a member of the Bohemian Club Orchestra, Mr. Padgett performed under the baton of Richard Williams, a former conductor of the London Symphony Orchestra.

After graduating from the Stevenson School in Pebble Beach, California, Mr. Padgett attended Vassar College in Poughkeepsie, New York, where he graduated Phi Beta Kappa with a degree in Psychology. At Vassar he studied piano with Blanca Uribe, music theory and composition with Richard Wilson (a student of Aaron Copland), and played violin with the Vassar College Orchestra.

On February 3, 2009 – the bicentennial of Mendelssohn's birth – Mr. Padgett discovered the unstated Principal Theme to Edward Elgar's Enigma Variations: *Ein feste Burg* (*A Mighty Fortress*) by Martin Luther. His original research is featured on his blog (*enigmathemeunmasked.blogspot.com*) which has received over 229,000 page views. A member of the Elgar Society, Mr. Padgett is married and has five children.