

THESIS

The alleged color-sound synesthesia of American composer Amy Beach may have been a legitimate, lifelong condition that influenced her music compositions. The extent to which her mother, a vocalist and pianist may have encouraged key-color associations in early childhood and stimulated the manifestation of synesthesia in Beach, contrasted to the extent to which her husband, a physician of high social position, may have silenced her discussion and outward development of this stigmatized condition, problematizes any conclusion.

ABSTRACT

Some biographers regard American composer Amy Beach (1867-1944) as a musical synesthete, capable of perceiving and associating sounds with colors, and there is some evidence that this cognitive condition influenced aspects of her music such as color-key association, harmonic modulations, choice of instrumental timber and tessitura, and compositional architecture. Others downplay the significance of her alleged synesthesia because of her seeming reticence to discuss or capitalize on it (in contrast, for example, to the sensationalism of her Russian contemporary Alexander Scriabin). Beach's mother, a vocalist and pianist, encouraged her young daughter to associate colors with musical keys leading to the question of her mother's influence on her daughter's imagination or the strong possibility of her mother being a synesthete, thus encouraging a genetically predisposed condition. Beach married early in life. She then readily acceded to the wishes of her elderly husband, a wealthy medical doctor and Boston elitist, who may have discouraged her discussion of synesthesia to avoid stigma in the medical world. Compared with the fulltime engagement of active composing, synesthesia may have slipped into the background of tools for her compositional palette.

INTRODUCTION

Definition of Synesthesia

There are many different forms of synesthesia. Color-sound synesthesia relates to the ability to visualize colors in association with words or sounds and has a long history in mankind¹. The phenomena of synesthesia is widely accepted by scientists, clinicians and psychologists and eagerly explored by neuroscientists through modern brain imaging techniques^{2, 3, 4} including research regarding the ability of non-synesthetes to process information using multi-sensory modalities.⁵ Musical synesthesia is viewed as a certain plasticity of the brain, combining both visual cortex and auditory brain pathways in a single sensory experience. In essence, visual cortex is activated during sound perception, resulting in color-music synesthesia events. While “direct” synesthetes actually see colors associated with sounds (activating primary visual brain areas), “associate” synesthetes can only imagine colors with sounds (employing surrounding visual cortex). The latter is the case with Amy Beach.

Amy Beach - Her Early Childhood and Mother's Influence

¹ Cytowic, Richard E, *Synesthesia: A Union of the Senses*, (Cambridge Mass, MIT Press 2002). Cytowic includes a nice history of synesthesia and demographics on synesthete populations, a list of typical colors associated with the English alphabet, case study evaluations of patient consistency (and rare inconsistencies) with naming colors and musical keys/ chords, syllables, vowels and consonants. Cytowic's book includes gender ratios, inheritance values and other prevalent conditions for musical synesthetes, including perfect pitch.

² Nicholas Rothen and Beat Meier, “Do Synesthetes Have a General Advantage in Visual Search and Episodic Memory? *PLoS ONE* 4, no. 4 (2009): e5037. This study explores the suggestion that synesthetes may have advantages in visual search and episodic memory tasks through abilities to rely on combined-sensory cues.

³ Tessa van Leeuwen et al. “Synaesthetic Colour in the Brain: Beyond Colour Areas. A Functional Magnetic Resonance Imaging Study of Synaesthetes and Matched Controls.” ed. Mark W. Greenlee. *PLoS ONE* 5, no. 8 (August 2010): e12074. This paper examines parts of the brain that are activated during color-sound synesthesia – during both direct and associate forms.

⁴ Oliver W. Sacks, *Musicophilia: Tales of Music and the Brain*. 1st ed. (New York: Alfred A. Knopf, 2008):p165-183. Sacks has an entire chapter on synesthesia that is mostly focused on musical and color experiences by individuals, especially as by composer Michael Torke. Sacks observes that each individual has their own color scheme and the only guaranteed way to lose this ability is destruction of visual cortex. Sacks proposes that 40% of children are synesthetes but most lose it around the age of 3 months. It can thus be regarded as an innate capacity that is disengaged in infancy. Synesthesia experiences can generally reemerge in adulthood, most often 1. During seizures or 2. Through the use of hallucinogens.

⁵ CV Parise and C Spence, 2009 ‘When Birds of a Feather Flock Together’: Synesthetic Correspondences Modulate Audiovisual Integration in Non-Synesthetes. *PLoS ONE* 4, no. 5 (2009): e5664. This study presents stimulus to sensory and visual arenas to provoke the synesthetic experience in “non-synesthetic” individuals.

Turn-of-the-century American composer, Amy Beach, was a child prodigy and is regarded as an associate synesthete (imagining colors when hearing music). Amy's early childhood in New Hampshire was that of a remarkable child prodigy. At age 1, she could sing 40 tunes in perfect tune and soon harmonized against her mother's soprano melodies. At ages 3 and 4, she taught herself how to read and play the piano, respectively, and could accurately play back 4-part hymns on the keyboard. Her mother began formal lessons with Amy at age 6. When Amy was 8, the family moved to Boston.⁶

Color-key associations surface early in Beach's biographical material as Amy's influential mother encouraged her to relate melodies to various colors⁷. It is possible that synesthesia was simply implanted in the creative, malleable young mind of Beach by her strongly influential mother. Clara Marcy Cheney, who was both a well-regarded singer and pianist in New Hampshire music circles⁸, encouraged Amy to associate colors with musical keys from an early age. It is more likely, however, that Amy's mother may have been somewhat a synesthete herself, in which case there is strong likelihood that Amy was genetically predisposed to synesthesia and merely propelled towards it early in life by her mother. While it is possible that Amy's associate-type synesthesia developed as more of a compositional tool for the composer rather than being an innately genetic syndrome, it is more likely that synesthesia was not only inherited from her mother, but encouraged, promoted and rewarded through her musical activity from a very early age.

⁶ Laurel Keddie Verissimo, *Amy Beach: Her Life, Times and Music* Masters Thesis, (San Jose State University, 1993):p9-10. This Masters project report focused on Amy Beach's role in feminist movement of America, with emphasis on an unpublished work *Theme and Variations*, Op. 80, for flute and string quartet after a lengthy and comprehensive biographical review.

⁷ Walter S. Jenkins, *The Remarkable Mrs. Beach, American Composer: A Biographical Account Based on Her Diaries, Letters, Newspaper Clippings, and Personal Reminiscences*. (Warren, Michigan, Harmonie Park Press, 1994). This is standard reference text and Beach biography. Mention of Amy's mother who encouraged her daughter's use of colors and key associations is found on p. 5.

⁸ Adrienne Fried Block, "Why Amy Beach Succeeded as a Composer: The Early Years," *Current Musicology* 36 (1983):41-59. Amy's mother was a highly regarded pianist and singer who, according to reviewers, had a very promising career before her marriage. Details of her mother's regard for Amy's progress are found on page 42 of this article.

If Amy Beach's mother had synesthesia, there is a 72% probability that she passed it on to her daughter. Furthermore, synesthesia is 6 times more prevalent in females than males.⁹ It is likely that her mother was also a synesthete, at least to some degree. Synesthesia, therefore, may indeed have been a legitimate, genetically innate ability, that took full root in Beach's genius young mind. Music then provided an immense vehicle for full and passionate fruition of this combined-sensory facility. Amy Beach's mother clearly had a strong early influence on her daughter's musical modeling, including color-key associations. She may have, therefore, naturally promoted to her daughter what she herself (as a synesthete) would find useful in composing. Her mother certainly did not find a aversion to color-key synesthesia (as later, Beach's overbearing husband may have had).

Amy Beach's childhood was as much that of a pianist and recognized prodigy as that of a composer. Therefore, other forms of synesthesia (emotional, cognitive, reactive) may have been developed through her highly tactile experiences at the piano. "Colors", at any instrument are an acceptable teaching methodology, as are "emotions", "feeling", "impact", "dimensions", etc. These are all facets and modalities of the synesthesia experience abundant in good piano playing and Amy Beach developed strongly along these lines. Her synesthesia (as currently diagnosed by neurologists) was unlikely limited to color-key associations only. Understanding the magnitude and frailty of Amy's gifts, her mother wisely sheltered the young genius throughout her childhood and teenage years.

Name That Color!

⁹ Simon Baron-Cohen S et al., "Synaesthesia: Prevalence and Familiarity" *Perception* 25, no. 9 (1996):1073–1079. Baron-Cohen is a leading expert in synesthesia. Although his percentages regarding inheritance and gender ration for synesthesia are high (compared with Cytowic's which are 62% and 25 female:male ratio), Baron-Cohen maintains a high academic standing in the field. These numbers can be considered a benchmark, if not universally agreed upon.

Amy also composed in childhood, using color-key associations that, as with all synesthetes, are individually consistent and formulaic. Her childhood color modes were: C-white, E-yellow, G-red, A-green, Ab-blue, Db-violet, Eb-pink and minor keys, both F# and G# - both “black”.¹⁰

Musical ability (including composition) is routinely regarded as a predominantly right brain ability¹¹, as is the area of music discrimination and reasoning¹². Color-sound synesthesia, on the other hand, is a purely left hemispheric-dominant phenomenon¹³. Amy’s color-sound synesthesia, therefore, may have been thwarted by right hemispheric-dominant musical abilities, thus tempering fullest epigenetic manifestation of Beach’s condition. Tempering of her color-sound synesthesia may also have initiated through her piano playing (predominant use of the corpus callosum, a large white matter tract that connects right and left brain) and later by her learning foreign languages (which hyperuse the brain’s language and cognition areas - Broca’s and Wernicke’s area, respectively) and even later by her husband’s strict control of her musical activities.

Amy Beach is not unique in her synesthesia although she is one of the few women synesthetes of note¹⁴. Other noted synesthete composers are: Olivier Messiaen¹⁵, Rimsky-Korsakoff, Michael

¹⁰ Adrienne Fried Block, *Amy Beach, Passionate Victorian: The Life and Work of an American Composer, 1867-1944*. (New York: Oxford University Press, 1998):p10. Key-color associations in this section are not even referenced, due to the fact that this is such common knowledge regarding Beach’s early color-music association.

¹¹ R Joseph. "The Right Cerebral Hemisphere: Emotion, Music, Visual-spatial Skills, Body-image, Dreams, and Awareness." *Journal Of Clinical Psychology* 44, no. 5 (September 1988): 630-673. *MEDLINE with Full Text, EBSCOhost* (accessed July 30, 2011). A well-annotated and cited study regarding right and left brain processes, clearly outlining the fact that music processes are right brain dominant.

¹² Anne J Blood, Robert J Zatorre et al., "Emotional Responses to Pleasant and Unpleasant Music Correlate with Activity in Paralimbic Brain Regions." *Nature Neuroscience* 2, no. 4 (1999): 382. *Academic Search Complete, EBSCOhost* (accessed July 30, 2011). *Nature neuroscience* 2, no. 4 (April 1999):382-287. Zatorre is one of the current reigning experts on music and brain processes. This study focuses on dissonances versus pleasant music, both which activate right brain processes. Musical dissonance is explored through cerebral blood flow measures.

¹³ van Leeuwen, “Synaesthetic Colour in the Brain,” p.____ The left temporal lobe and the visual V4 striate areas engage during color-sound synesthesia.

¹⁴ Baron-Cohen, *Synesthesia*, p.____ This is ironic considering the statistics mentioned earlier with 6:1 ratio and high female inheritance.

¹⁵ Jonathan W. Bernard “Messiaen's Synaesthesia: The Correspondence between Color and Sound Structure in His Music” *Music Perception* 4, no. 1 (Fall, 1986):41-68. Oliver Messiaen’s color synesthesia was formulaic and complex, intricately connected to his musical output.

Torke and Alexander Scriabin. Scriabin spoke and wrote forthright of his synesthesia although critics continue to debunk this¹⁶. While key-colors are not consistent between these composers (i.e. G major can be red, orange, blue or green depending on the mind behind the notes), colors schemes reliably persist throughout the life of the synesthetic individual.

In considering the music of Amy Beach, color-key association is only one of multiple synesthetic elements that persist in her compositions. Her music is melodic, harmonic and tonal, yet constantly fluctuating and modulating in order to create subtle swings of mood and emotion. In this regard, Amy Beach's color associations are only a part of the full, passive synesthetic-listener's experience of her music.

Ultimately, the Music of Amy Beach has the last word. Specific examples of synesthetic writing may be found in her songs: "Dark", as musically scripted in Example no.1 "Prayer of a Tired Child" Op.75, no.4, mm. 24-30 (1914) delivers a haunting and evocative moment in the song, while "White" in mm. 13-16 of the same song (Example no. 2) is not necessarily in Beach's "white" key of C but the progression away indicates a non-white unsteadiness. "Blue" (Bleu) in Example no. 3 "Extase" Op. 21, no.21, mm. 61-64 (1983) is a striking modulation that maintains tension of this color, injecting G# (or Beach's Ab "blue") in the determining harmonic twist. "Gold" (d'or) mm. 44-46 in the same song (Example no. 4) is beautifully colored, again injecting E (Beach's "yellow") as the new color shift in the harmonic scheme. The song is also stylistically nuanced in the French style. "Dew-pearled" as musically scripted in Example no. 5 "The Year's at the Spring" Op.44, no.1, mm. 5-9 (1900) introduces a new meter, suspensions and a Gb (or flattened 6th in the key of Bb). Finally, a non-colored moment may be most telling. The line, "Drives the color from her cheeks" is musically scripted in the vocal phrasing in Example no. 6 "In the Twilight," Op. 97, no. 4, mm. 10-14 (1922).

¹⁶ B. M. Galeyev and I. L. Vanechkina, "Was Scriabin a Synesthete?" *Leonardo* 34, no. 4 (August, 2001):357 – 362. Scriabin's color diagram of keys and consistent descriptives of colors and musical notes bely claims that his synesthesia was bogus, however he may have used his condition in a sensationalist manner throughout his career.

This musically powerful phrasing in atonal format has no underlying accompaniment. Beach's melodic phrase slides in from a leading tone, jumps a ninth, then drops the octave before moving up a whole step, then sliding chromatically and eventually to the tritone where it fades to nothing, suggesting a vacuous, wandering, colorless void for the composer. The chronological progression of music to projecting color is perhaps the most telling, reflective as colorlessness in 1922.

Amy Beach's Short Career as a Professional Pianist

Amy's professional piano debut began in 1883 at the age of 16. She plays Chopin's Rondo in E (Oct 1883) for public audiences before her Boston Symphony Orchestra debut playing Chopin's F minor Concerto in March of 1885. This was followed by several other BSO concerts. Reviewers' comments¹⁷ consistently reveal synesthetic implications during these years:

"She plays with the intelligence of a master...remarkable and extraordinary gifts" *New York Tribune* (Oct 1883) ~ "pianist to the manner born and bred...correctness and precocity of her musical understanding ...not a mere imitative talent...the artist was speaking of herself and not merely reproducing the teacher's thought...either a great talent, or a great genius" *Boston Daily Advertiser* (Oct 1883) ~ "artistic wisdom that is far beyond her years..." *Boston Transcript* Jan 1884 ~ "a truth which many mature players never reach in more than one or two of their pieces" *Boston Advertiser* (Mar 1884) ~ "shut your eyes and listen...a child of genius, such as Liszt and Mendelssohn...a maturity of powers that would place her among the great geniuses of the world" *Boston Post* (Apr 1884)¹⁸

Marriage for a Childbride and Farewell to the BSO

Although Amy often performed publically as both child and youth, Amy's professional piano career began at the age of sixteen. Only 2 years later, at the age of 18, she married Henry Harris Aubrey Beach (1843-1910), a highly successful surgeon and lecturer at Harvard Medical School. Dr. Beach was 25 years Amy's senior and had known Amy since her early teenage years. He had

¹⁷ Jenkins, *The Remarkable Mrs. Beach*, All reviews quoted in this paper are taken from the Jenkins book on Amy Beach and are referenced individually, by source or author (if known) within paragraphs.

¹⁸ *Ibid.*

made a stained glass window for her hotel bedroom the same year his wife passed away.¹⁹ Beach and a group of his Boston elitist friends, Louis C. Elson, Percy Goetschius, H.W. Longfellow, Oliver Wendell Holmes and William Mason had carefully followed Amy's prodigious childhood. It is not known what the pre-nuptial "bargain" may have been but Amy eventually fell in love with the elderly, widowed doctor. His input ultimately had a profound, pivotal influence in her life in many ways.

Dr. Beach married Amy at the tender age of 18, then insisted that she focus on composing rather than performing publically - and so she did²⁰. This elderly Harvard professor and physician, 25-years her senior, had a very strong influence on her for as many years. Whether Amy married for romantic love or sought an extension of the protective wing her mother had provided for so many years or whether she simply sought growth at all costs, even if it meant marrying a man older than her own father, she seemed to love the prestige of her standing in the Boston elite. The question remains as to the integrity of her work in such circumstances. Amy (in her twilight years) says, "I doubt, seriously, if any woman will ever take a place among the really great composers of the world because women must be occupied with...duties of the home, for instance, serve to occupy a great part of any woman's life."²¹

Beach, nonetheless, was very proud of her husband and marriage and her life was strongly influenced by him. She apparently obeyed most, if not all his suggestions. Beach's physician husband may have discouraged the discussion or any outward manifestation of her synesthesia and, in order to please her husband, Beach may have done anything possible to avoid use of her synesthesia or mention of it in public to satisfy him. Synesthesia was certainly more of a stigma then than in today's world.

¹⁹ Jenkins, *The Remarkable Mrs. Beach*, p.14. Interesting overlap of Dr. Beach's marriage of 25 years and his infatuation with the young Amy Beach which later resulted in a virtual child-bride marriage and full curtailing of her professional performance career. Did the good doctor simply take the young genius hostage?

²⁰ Block, Adrienne Fried. *Amy Beach, Passionate Victorian* The pros and cons of this uneven marriage, for both husband and wife are thoroughly discussed pages 42-55.

²¹ Hope Ridings Miller. "No Feminine Beethovens, Says Woman Composer." *Washington Post*, April 24, 1934. This is an excellent primary source with direct quotes from Beach regarding women's role in society and on domestic confines that thwart any woman becoming a serious composer.

Reviewers Reveal the Effects of Marriage on Amy's Music

Reviews of her piano playing during early years of her marriage change notably. There are no more dazzling reviews or mention of words such as “genius, wisdom, mastery” or the like. She takes the professional name of Mrs. H.H.A. Beach. Reviews now seem to focus much more on her simple adeptness, rudimentary proficiency and clarity as a technician during this period:

“simplicity and absolute truth...brilliant...but undazzling ease of the allegro...smoothness tender, but unaffected...pearly precision...all new...illustrations of the true artist...patient in faithful study” *Boston Advertiser* (Feb 1886) ~ “delightful; her technique seems to have gained even in smoothness and clearness...thorough musicianship” *Boston Transcript* (Mar 1886)

Only 2 years after her glowing professional debut and after a recent marriage, gone are the glowing masterful, genius-level raves regarding Amy Beach. Her performing career was curtailed by marriage while Beach began a more serious career in composing at the urging of her husband. She initially produces her first large scale work, *Mass in Eb* (which was promoted as *The Beach Mass*). Eb major would be Amy's “pink” key. Her reviews were again powerful and glowing, possibly indicating transference of her synesthesia gifts to her compositional work:

“unmistakable fervor and feeling...grandeur of the words...passages were actually luminous with a brightness akin to that of faith and true sentiment.” Julia Ward Howe of *Women's Journal* (Feb 1892) ~ “a work of long breath...knowledge, skill...application, patience and industry...fixed ideas of her own...not hesitated to carry them out.” Philip Hale of *Boston Journal* (Feb 1892) ~ “reposeful dignity of form...solemnity and fervor...healthful vigor of the composer's mind, and of her originality in construction and expression.” Mrs. T.H. Garrison of *Woman's Journal* (Feb 1892)

Reviews, at least of her larger subsequent works thereafter, reveal a decline in reviewer comments that, again, reflect a quelling of synesthetic-like qualities, as noted in reviewers' observations and commentary. *Gaelic Symphony* (1896-99), *Piano Concerto* (1900-04) and *Piano Quintet* (1905-09) reviews focused more on Beach's command of large-force compositional techniques rather than original artistic expression:

Gaelic Symphony: “the third movement is long-winded, laboriously contrived, and at times downright dull.” *Boston Journal* Feb 1898 ~ “not a profound work, and it makes no attempt at an exploration of the classic methods...first and last movements are somewhat turgid in style and uncertain in form, but...rich in color” – *New York Times* Feb 1898 ~ “beyond her powers” – *New York*

Tribune Feb 1898 ~ *Piano Concerto*: “the concerto is monotonously void of contrasts. There are fire enough and passion enough in the work, but they did not appear to lead to anything that was coherent or comprehensible.” *Boston Herald* Apr 1900 ~ *Piano Quintet*: “sure acquaintance with the technic of composition...well planned and carried out” *Boston Herald* Feb 1905

Whether the demands of marriage simply drained her of time to fully express her core musical means or if she was trying to mold her musical productions to please her husband and his Boston elite circle of friends, who ideally celebrated restraint rather than full artistic expression, remains to be determined by further research.

Husband's Death Releases the Pianist from Bondage

After the doctor's death in 1910, Amy found a new artistic freedom and regained her identity as a performer. It is most interesting to note that soon after her husband's death in 1910, Beach reverted back to her maiden name and set off on a performance tour of Europe for 3 years. It was as if she was patiently awaiting the opportunity to do so, as there was no obvious period of mourning for her. Her synesthetic prowess also returns. Nowhere is this more evident than in reviewer's observations of Amy's music, which had apparently changed again:

“[Beach's] understanding of the music...enables her to transform what, in other hands, however skilled technically, might be a colorless combination of tones, into a brilliant weave of many distinct yet intricately woven voices, presenting a rich and wonderful colorful tapestry of sound.”²² ~ “sunshiny, spontaneous music...listeners [were] caught up into a seventh heaven of delight...day long remembered.” *Musical Leader* (Nov, 1912) ~ “every one of [her] dazzling notes had its meritable place and meaning; that not one of them was introduced for mere ornament or parade...unflagging vitality...one marveled at the inexhaustible forms of energy from which poured forth this racing torrent of ideas.” *St. Louis Post Dispatch* (Nov 1912)

Later in her life, Beach again talks about music in terms of colors, still referring to C major as “white” music, A major - green, A-flat - blue and G-sharp minor - black, etc. and her consistent perceptions, combined with the synesthetic advantage of having perfect pitch, thus support the notion

²² Jenkins, *The Remarkable Mrs. Beach* According to Amy's cousin, Ethel Clement, present at an Italian concert.

that her synesthesia was legitimate.²³ Many reviewer's descriptions of her music were consistently laced with synesthetic (not necessarily color-sound type) superlatives, as in addition to mention of her musicianship and technical skill. Phrases such as "artistic purpose and thought which...animate the form", "sensitive and expressive...increasing ecstasy of the verses" and "deeply religious and emotional music" providing "dignity and purpose to [singers'] profession" are regularly noted.²⁴

CONCLUSION

As Beach exercised the non-color synesthetic part of her brain through composition and musical activity to such large extent, particularly during her marriage and during her attempts to master orchestration and form while tending house for the doctor, her synesthetic abilities may have become relatively dormant. And while her color-music synesthesia may have been moderately cloaked, other unlabeled-at-the-time (and therefore non-stigmatized) forms of synesthesia such sound and emotion, emotion and architecture, key modulation and musically structured, targeted cognitive journeys may have become firmly employed throughout her compositions. Strong cognitive, emotional values seem evident in her compositions, while strategically structured so to avoid possible scrutiny, criticism or silencing from her Boston physician husband's elitist inner circle.

Amy Beach may have cleverly hid the true nature of her synesthesia abilities in order to please her much older, influential husband. She only spoke of color-key associations in a detached, professional manner, thus underplaying the great power of synesthesia in her compositions. Nonetheless, the Music of Amy Beach reveals many aspects of synesthesia. Further research is needed to ascertain if color-key associations are her primary tool revealing consistent cognitive aspects of her music. Without texts, however, "colors" in her orchestral compositions can often only be speculated

²³ Anon. "American Woman Composer Scores Thought of Retiring." *The Christian Science Monitor*, Dec 16, 1937. Beach reviews her color associations and also talks about her role in women's liberation to (yet another anonymous) interviewer and recording journalist. In this interview, Beach lists her color-key associations, exactly as they were in her childhood.

²⁴ Anon. Advertisement of Arthur P Schmidt, music publishers *Resource Guard*, circa 1890-91. This is an advertisement from Beach's publisher that extols the quality of three new, recently published songs *The Secret*, *Sweetheart*, *Sigh no More* and *Hymn of Trust* (with violin ad lib.).

upon. Comments by the composer are notably lacking regarding specific connections of her synesthesia-related abilities to her compositions. Lack of comment may have been to avoid stigma of the medical world, as per instruction from her husband. If so, her strategy to consciously avoid and deny the existence of synesthesia in her own life may have led to her feminist renaissance upon the death of her husband, which resulted in a retaking of her maiden name immediately upon his death and speaking again publically of color-sound associations that were so strong and vivid to her as a child.

Ultimately, the composer's music has the final word regarding color-key-cognitive synesthesia that potentially transfers this experience through music and the brain's mirror neuron system to listeners²⁵²⁶. This paper has examined the history and music of the composer while examining reviewers' observations to Beach's music, in order to shed light on the real (or imagined) nature of this composer's color-music (and possibly other varieties of) synesthesia. Reviewers' comments reveal clear transference (the unconscious redirection of feeling or cognition) of Amy Beach's synesthetic abilities to her music in the years before her stifling marriage to Dr. H.H.A. Beach. During the years of her marriage, Amy focuses on technical development as an orchestral composer, while writing many large (and smaller) works. This is reflected in reviewers' comments of her compositions. Immediately upon the death of her husband, Amy's returns to making pre-marriage-like impressions on reviewers, again reflecting the synesthetic gifts that were so much a core part of the composer.

²⁵ Jaime A Pineda, "Sensorimotor Cortex as a Critical Component of an 'Extended' Mirror Neuron System: Does it Solve the Development, Correspondence, and Control Problems in Mirroring?" *Behavioral and Brain Functions* 4, no. 47 (2008):1-16. Sensorimotor mechanisms are necessary to maintain activation of the mirror neuron system. Music provides such sensory input, thus the mirror neuron system may explain the power of music as it transfers the intention of the composer to the listener through cognitive and motor pairing mechanisms.

²⁶ Giacomo Rizzolatti and Laila Craighero, "The Mirror Neuron System" *Annu Rev Neurosci* 27 (2004):169-92. The mirror neuron system serves to facilitate understanding dependent on imitation. The article focuses on the visual cortex mirror system and activity in motor and parietal areas when passively observing another organism's activity. This can feasibly be applied to cognitive processes when hearing synesthetic music.

Musical Examples:

Example no. 1 Amy Beach, "Prayer of a Tired Child," Op.75, no.4, mm. 24-30. (1914) Color: Dark ²⁷

sempre dolcissimo e più tranquillo

pray. Dear Fa - ther, will you hear me too A - long the

dark - - - long way?

pp quanto possibile

Example no. 2 Amy Beach, "Prayer of a Tired Child," Op.75, no.4, mm. 13-16. (1914) Color: White

used to car - ry in your arms The lamb - kins dumb and

pp

white. Who had grown wear - y of their play. And

²⁷ Amy Marcy Cheney Beach, *Twelve Songs for Medium to High Voice*, (Editor, Deborah Cook) (Bryn Mawr, PA, Hildegard Publishing Company 1994). This is the reference score for the musical examples in the paper. Songs referenced are: *Prayer of a Tired Child* Op.75, no.4, *Extase* Op. 21, no.21, *The Year's at the Spring* Op.44, no.1 and *Juni*, Op. 51, no. 3.

Example no. 3 Amy Beach, "Extase," Op. 21, no. 21, mm. 61-64. (1983) Color: Blue

Example no. 3 is a musical score for a vocal and piano piece. It consists of two systems of music. The first system features a vocal line with the lyrics "- nant leurs-cou-ron-nas de feu," and a piano accompaniment. The piano part includes markings for *cresc.*, *rit.*, and *con pedale*. The second system continues the vocal line with the lyrics "Et les flots bleus, que rien ne gou-verne et n'ar-". The piano accompaniment in this system includes markings for *pp (a tempo)*, *(a tempo)*, *(a tempo) pp arpeggiando*, and *con pedale*. The score is written in a key signature of one sharp (F#) and a 3/4 time signature.

Example no. 4 Amy Beach, "Extase," Op. 21, no. 21, mm. 44-46. (1983) Color: Gold (d'or)

Example no. 4 is a musical score for a piano and vocal piece. It consists of two systems of music. The first system is a piano accompaniment featuring a *[deliberamente]* marking. The second system features a vocal line with the lyrics "Et les é-toi-les d'or, lé-gions in-fi-". The piano accompaniment in this system includes markings for *pp*, *[p]*, and *[pp]*. The score is written in a key signature of one sharp (F#) and a 3/4 time signature.

Example no. 5 Amy Beach, "The Year's at the Spring," Op. 44, no 1, mm. 5-9. (1900) Color: "Dew-pearled"

The image shows a musical score for Example no. 5, Amy Beach's "The Year's at the Spring," Op. 44, no 1, mm. 5-9. The score is in 3/4 time and features a vocal line and a piano accompaniment. The vocal line includes the lyrics: "Morn - ing's at sev - en: The hill - side's dew - pearled:". The piano accompaniment consists of a right hand with a triplet of eighth notes and a left hand with a steady eighth-note accompaniment. Dynamic markings include *more:*, *cresc.*, *p a tempo*, *poco rall.*, *f poco rall.*, and *rit.*

Example no. 6 Amy Beach, "In the Twilight," Op. 97, no. 4, mm. 10-14. (1922) Color: (Sad and) Cloudy²⁸

The image shows a musical score for Example no. 6, Amy Beach's "In the Twilight," Op. 97, no. 4, mm. 10-14. The score is in 3/4 time and features a vocal line and a piano accompaniment. The vocal line includes the lyrics: "As they beat at the heart of the mo - ther Drive the co - lor from her cheek?". The piano accompaniment consists of a right hand with a steady eighth-note accompaniment and a left hand with a steady eighth-note accompaniment. Dynamic markings include *mf*, *rit.*, *p*, *pp*, *molto dim.*, and *ppp*.

²⁸ Amy Beach, "In the Twilight," Op. 85 (Arthur P. Schmidt, 1922), mm. 105-14.

REFERENCES

- Anon. "American Woman Composer Scornes Thought of Retiring." *The Christian Science Monitor*, Dec 16, 1937.
- Anon. "Great Success of the New Mass in E-flat [sic] as Written by Mrs. H.H.A.Beach," *Boston Daily Globe* Feb 8, 1892.
- Baron-Cohen S, Burt L, Smith-Laittan F, Harrison J, Bolton P, 1996, "Synaesthesia: prevalence and familiarity" *Perception* **25**(9) 1073 – 1079.
- Beach, Amy Marcy Cheney, *Twelve Songs for Medium to High Voice*, (Editor, Deborah Cook) (Bryn Mawr, PA, Hildegard Publishing Company 1994). This is the reference score for the musical examples in the paper. Songs referenced are: *Prayer of a Tired Child* Op.75, no.4 (1914), *Extase* Op. 21, no.2 (1983) and *The Year's at the Spring* Op.44, no.1 (1900).
- _____. "In the Twilight," Op. 85 (Arthur P. Schmidt, 1922).
- Bernard, Jonathan W., "Messiaen's Synaesthesia: The Correspondence between Color and Sound Structure in His Music" *Music Perception* 4, no. 1 (Fall, 1986):41-68.
- Block, Adrienne Fried. *Amy Beach, Passionate Victorian: The Life and Work of an American Composer, 1867-1944*. New York: Oxford University Press, 1998.
- Cytowic, Richard E, *Synesthesia: A Union of the Senses*, (Cambridge Mass, MIT Press 2002):
- Block, Adrienne Fried, "Why Amy Beach Succeeded as a Composer: The early years," *Current Musicology* 36 (1983):41-59.
- Blood, Anne J., Robert J. Zatorre, Patrick Bermudez, and Alan C. Evans. 1999. "Emotional responses to pleasant and unpleasant music correlate with activity in paralimbic brain regions." *Nature Neuroscience* 2, no. 4: 382. *Academic Search Complete*, EBSCOhost (accessed July 30, 2011).
- Galeyev B.M and I. L. Vanechkina, "Was Scriabin a Synesthete?" *Leonardo* 34, no. 4 (August, 2001):357 – 362.
- Jenkins, Walter S. *The Remarkable Mrs. Beach, American Composer: A Biographical Account Based on Her Diaries, Letters, Newspaper Clippings, and Personal Reminiscences*. (Warren, Michigan, Harmonie Park Press 1994).
- Joseph, R. "The right cerebral hemisphere: emotion, music, visual-spatial skills, body-image, dreams, and awareness." *Journal Of Clinical Psychology* 44, no. 5 (September 1988): 630-673. *MEDLINE with Full Text*, EBSCOhost (accessed July 30, 2011)
- van Leeuwen, Tessa M., Karl Magnus Petersson, and Peter Hagoort. "Synaesthetic Colour in the Brain: Beyond Colour Areas. A Functional Magnetic Resonance Imaging Study of Synaesthetes and Matched Controls." Edited by Mark W. Greenlee. *PLoS ONE* 5, no. 8 (August 2010): e12074.
- Miller, Hope Ridings, "No Feminine Beethovens, Says Woman Composer." *Washington Post*, April 24, 1934.
- Parise CV, Spence C, 2009 'When Birds of a Feather Flock Together': Synesthetic Correspondences Modulate Audiovisual Integration in Non-Synesthetes. *PLoS ONE* 4(5): e5664.
- Pineda, Jaime A, "Sensorimotor Cortex as a Critical Component of an 'Extended' Mirror Neuron System: Does it Solve the Development, Correspondence, and Control Problems in Mirroring?" *Behavioral and Brain Functions* 4, no. 47 (2008):1-16.
- Nicholas Rothen and Beat Meier, "Do Synesthetes Have a General Advantage in Visual Search and Episodic Memory? *PLoS ONE* 4, no. 4 (2009): e5037.
- Rizzolatti, Giacomo and Laila Craighero, "The Mirror Neuron System" *Annu Rev Neurosci* 27 (2004):169-92.
- Sacks, Oliver W. *Musicophilia: Tales of Music and the Brain*. 1st ed. New York: Alfred A. Knopf, 2008.
- Verissimo, Laurel Keddie, *Amy Beach: Her Life, Times and Music*, Masters Thesis (San Jose State University, 1993):42pp.

