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**Developing a four-mallet marimba technique featuring the alternation of mallets in each hand for linear passages and the application of this technique to transcriptions of selected keyboard works by J.S. Bach**

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DEVELOPING A FOUR-MALLET MARIMBA TECHNIQUE FEATURING  
THE ALTERNATION OF MALLETS IN EACH HAND FOR LINEAR PASSAGES AND  
THE APPLICATION OF THIS TECHNIQUE TO TRANSCRIPTIONS OF SELECTED  
KEYBOARD WORKS BY J.S. BACH

A Monograph

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in

The Department of Music

by  
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## **Dedication**

This paper is dedicated to Dr. John Raush. In the without-whom-this-paper-would-not-have-been-completed list, Dr. Raush's name must be on the top of page one in bold letters. His knowledge, professionalism, kindness and support have made it possible for me to complete a paper in which I take great pride.

I would like to relate four representative memories of my time with Dr. Raush that continue to motivate me to become a better musician and scholar:

- 1.) When I was stumped for a word that meant, “existing body (of materials for the training of two hands),” Dr. Raush was the one who produced the word, “canon.” It is my favorite single word in the entire paper.
- 2.) Watching Dr. Raush play timpani in the Baton Rouge Symphony (most remarkably during Stravinsky’s Rite of Spring) was an enlightening lesson in what a commanding role a timpanist may take in an orchestra. His playing lent a tangible element of stability (not to mention excitement) to the most dangerous of ensemble passages. Several members of the orchestra commented, to me after the Rite of Spring “block”, that the solidity of his playing actually made their parts less difficult and more exciting.
- 3.) His abilities as a percussionist are tremendous, but he supplements these skills with a pan-disciplinary musicianship that I find truly inspiring. His knowledge of music history and theory as well as instruments and literature outside the field of percussion is nothing short of brilliant.
- 4.) “Dr. Raush is the greatest musician, on any instrument, that I know.” This comment came from one of his colleagues in the LSU School of Music. The particular phrasing is notable for its succinctness, but the content is not at all uncommon when discussing Dr. Raush. I intend to make it my life's work to earn this kind of respect from my future colleagues.

I sincerely appreciate the privilege of having studied with Dr. Raush. I wish him the best of luck and happiness for his (finally student-free) retirement.

## Acknowledgments

I am fortunate to have a very large, three-pronged, extended family. To begin, how many people are lucky enough to have six loving parents? Mom and Steve, Dad and Schafalia, Papa (Wee) and Mama (Koh) have all helped me in so many ways that I couldn't begin to relate them here. I love and respect them and wish I could spend every day with them all (which is highly unlikely as they are on opposite sides of the globe). To my siblings: Toby, Traci, Krista, Scott, Edie, Amy, Tommy, ah Ping, Le Hong, ah Pang, and Kok Yi (notice I didn't call you ah Boy); I wish to express my gratitude for teaching me about all the things that are important in life. I believe that the interpersonal skills we learn in kindergarten are honed throughout our lives and largely through our relationships with siblings—I have eleven solid, good, kind people that I can call brothers and sisters. I do have to make a particular mention of my brother Toby, who I also consider to be my best friend. Toby teaches me, subtly, in nearly every conversation, the meaning of the words self-control and diligence. He has looked to me as his “big brother” all of our life, but it is only now, as we reach our middle 30's, that he (I think) is beginning to realize the incredible scope of the effect HE has had on MY life. I thank Uncle Clarence and Auntie Mae for teaching me so many things about life. Managing money, digging a hole, chopping wood, farm-style cooking, and driving tips (the kind they would never teach you in Driver's Ed.) are just a few of the skills I learned visiting their house while growing up. Grandma Laura and Grandma Vida did everything that the greatest of grandmothers are supposed to do—either of them could be put on display as role models for the grandmothers of the future.

And the only family member who gets a paragraph to herself is the most important person in my life: my wife, Le Khin. If everyone in the world were as happy and content in their home as I am (because of this great woman), the world would be a better, and more

peaceful, place. She takes care of me, keeps me grounded in reality, and brightens my life daily in a myriad ways of which she is not even aware. I love her with all my heart, and have great difficulty imagining my life without her.

To my friends in Baton Rouge, thank you for showing me that there is more to life than a career, and for sharing that “more” with me. Cason, Cassandra, and Janeice taught me, among other things, how to hug my friends and (on a professional note) showed me, by example, the benefits of consistent daily practice routines. Charles made me a better person by getting me involved in the serious study of chess. Doran’s comments (as a fellow marimbist) were very helpful in the final stages of this study. Craig and Steph. were the first married couple (of friends) that I truly enjoyed visiting—“hanging out” and talking with you two is among my fonder memories of Baton Rouge. Aaron and Borislava: here is an immensely talented couple unlike any other I know. I’ll never forget playing chess on the giant board while eating that delicious Bulgarian food!

John Bolter and Brenda Dawson are, quite literally, lifesavers. Their counsel during my wife’s illness is directly responsible for the quality of life that I (and happily we) enjoy today. As if that weren’t enough, their hospitality and warm companionship over the years have made each trip to Baton Rouge an absolute joy. I consider them the older brother and sister that I never had growing up and I look forward to someday repaying their selfless generosity.

To Reverend Mike Aus, his wonderful family, and the people of the Lutheran Church of our Savior, my wife and I owe a debt of gratitude. Though my wife and I are not Lutheran, Reverend Aus and his congregation adopted us in our times of trouble and made us feel as if we were one of their own. Their kindness shows the best qualities that humanity has to offer. May God bless them all.

If a scholar's professional life is the sum of his experiences, and I believe that it is, then the influence of teachers and mentors is of paramount importance. Throughout my undergraduate and masters degrees, I was privileged to work with exemplary percussion teachers. The following paragraphs describe a few of the ways in which each of them has gone beyond what I ever expected, or even hoped for, from my teachers.

Dr. Mueller's conception that the marimba should be the center of training for a percussionist, truly influenced the direction of my life. It was he, and he alone, who encouraged me to pursue graduate studies and led me to believe that I could someday be a college percussion instructor. Without Dr. Mueller's meticulous instruction of marimba technique, this paper would never have been possible.

While I never studied marimba with Jeff Nearpass, his infectious enthusiasm for all aspects of percussion has helped me to retain an almost child-like enjoyment of all things percussion. My interest in ethnomusicology and organology came directly from my time with Mr. Nearpass. He also made it possible for me to attend my first PASIC a few years ago, for which I will always be grateful.

Mike Hanes helped me to mature, as a musician, beyond the limits of percussion, and helped me to assimilate that experience back into my percussion techniques. Mr. Hanes was the first to share my excitement about alternation sticking, and has actively encouraged me to pursue it ever since. The "hands-on" teaching experience I got during my time at SIU, and Mr. Hanes' leadership in processing that experience, have made me a better musician and teacher.

Humble thanks to my friends from Double Click Pte. Ltd. in Singapore. The knowledge and experience I gained while working with Double Click enabled me to produce the more-than 200 figures seen in this paper. Chok was quite brave in hiring me for a job for which (in

retrospect) I had no practical experience. That job turned out to be one that trained me to work with computers and multimedia software, not to mention giving me a chance to compose, do sound editing, teach, hire, fire, and design a curriculum. Of all these skills, only teaching and the little bit of composition, were job skills I had before joining Double Click—I will be forever indebted to Chok for the experience and knowledge he gave me. My two friends Soon Kwong and Chee Keen must also be mentioned here as they were the ones who were actually tasked with answering all of my questions. With almost superhuman patience these two shed light on my digital ignorance. I really miss the roti prata!

To the members of my examination committee, I would like to express my sincere gratitude. I realize that 200 page drafts, long-distance communications, and a “hard-headed” student like me were probably more than they bargained for, but as the process draws to a close, they continue to encourage and assist me and I genuinely appreciate their help. Dr. Kingan, as co-chair of the committee, deserves special recognition. I know that he has sacrificed precious time with his family to read and revise my early drafts and the paper is clearer and more readable for his comments.

I would like to include a special, heart-felt thanks to Dean Ron Ross for finding the words to comfort me at the lowest point of my life. He probably doesn't even remember the conversation, but when many people were at a loss to say anything at all, he found just the right words. I can't thank him enough for his kindness and empathetic compassion.

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## **Abstract**

The goal of this study is to develop a four-mallet marimba technique that utilizes alternation within each hand on linear passages, then apply this technique to selected keyboard works of J. S. Bach. This paper provides a method of training the hands for this type of alternation and will hypothesize a conception of hand positions as a method of facing the visual/spatial logistics issues of marimba performance. A performance annotation chapter will then apply the alternation sticking, and its resultant positional concepts, to three new transcriptions of J. S. Bach's inventions and a prelude and fugue from his Well-Tempered Clavier (Book II).

The alternation technique of this study is predicated on the hypothesis that certain linear passages for the two mallets of a single hand may be played with increased stability, accuracy, and efficiency using an alternation-based sticking in lieu of the repetition-based sticking practice used by contemporary marimbists. In many passages, the player may simply apply standard two-mallet left and right sticking practices to the two mallets of a single hand. The increased stability mentioned above may also aid the marimbist's kinesthetic sense of the bars, thereby improving accuracy in one hand and freeing more of the player's visual attention for the non-linear (or "other-linear") hand. The improved kinesthetic sense can assist in sight-reading, where the player must rely on the "mind's eye" (a combination of the player's kinesthetic sense and a mental picture of the keyboard) for both hands while the eyes remain trained on the unfamiliar page.

## Chapter 1: Introduction

The goal of this study is to develop a four-mallet marimba technique that utilizes alternation within each hand on linear passages, then apply this technique to selected keyboard works of J. S. Bach. This paper provides a method of training the hands for this type of alternation and will hypothesize a conception of hand positions as a method of facing the visual logistical issues of marimba performance. A performance annotation chapter will then apply the alternation sticking, and its resultant positional concepts, to three new transcriptions of J. S. Bach's inventions and a prelude and fugue from his *Well-Tempered Clavier* (Book II).

This alternation technique is predicated on the hypothesis that certain linear passages for the two mallets of a single hand may be played with increased stability, accuracy, and efficiency using an alternation-based sticking in lieu of the repetition-based<sup>1</sup> sticking practice used by contemporary marimbists. In many passages, the player may simply apply standard two-mallet left and right sticking practices to the two mallets of a single hand. The increased stability mentioned above may also aid the marimbist's kinesthetic sense of the bars, thereby improving accuracy in one hand and freeing more of the player's visual attention for the non-linear (or "other-linear") hand. Finally, this improved kinesthetic sense can assist in sight-reading, where the player must rely on the "mind's eye" (a combination of the player's kinesthetic sense and a mental picture of the keyboard) for both hands while the eyes remain trained on the unfamiliar page.

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<sup>1</sup> Throughout this paper "alternation sticking" shall refer to the use of alternation of the sticks within a single hand to play linear passages. Conversely, "repetition sticking" shall refer to the use of a repeating mallet to play a one-handed linear passage.

In Chapter 2, a brief look at four-mallet marimba technique through the latter half of the twentieth century will begin with some of the earliest examples of four-mallet playing in solo literature and progress to the modern practices of composers and significant performers. A cursory description of the grips available to marimbists at the turn of the twenty-first century will concentrate on the Musser grip,<sup>2</sup> as this paper will be primarily concerned with the application of alternation sticking to this grip.<sup>3</sup>

In Chapter 3, the types of passages that can benefit from alternation sticking will be discussed. Excerpts from contemporary marimba literature will show existing uses of single-handed narrow-interval and alternation sticking by composers and arrangers of the latter quarter of the twentieth century.

In Chapter 4, exercises and etudes will be presented to train a marimbist's hands for the challenges of playing at narrow intervals (required by alternation sticking). More specifically, the exercises and etudes will prepare the hands for four-mallet transcriptions of the keyboard music of J. S. Bach. Exercises will utilize familiar scalar "warm-ups," applications of snare drum rudiment patterns (a rich canon of binary-sticking pedagogy), and practice models taken from J. S. Bach's melodic-compositional technique. Bach themes and passages from existing

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<sup>2</sup> This study will follow Leigh Howard Stevens' practice of using the term "Musser Grip" (named after marimbist Claire Omar Musser), even though most players today call the modern version, "Stevens-" or "Musser/Stevens- Grip." See Chapter 2 for a more specific description of the development of this grip.

<sup>3</sup> This author primarily uses the Musser grip for the marimba, but his initial attempts at using alternation sticking with the Burton grip (named after vibraphonist Gary Burton) have been surprisingly effective. Players who are more experienced with the crossed-stick grips than the author of this study, may find that some (or even most) of the techniques described in this paper will apply to non-Musser players, however the author's lack of practical experience with these grips requires that that application lie outside the scope of the current study.

marimba literature wherein alternation sticking might assist the player will be discussed and alternative stickings will be presented. Original etudes, in contemporary styles, will specifically target the muscles needed to play narrow intervals and alternation sticking within a single hand. Finally, the relationship between a scale's visual-spatial profile and sticking selection will be examined and a procedure will be enumerated for generating efficient stickings regardless of the scale used by the composer.

Chapter 5 will provide annotated transcriptions of the "Prelude and Fugue in C Minor" from Bach's *Well-Tempered Clavier* (Book II) for "low-A" marimba, and his two-part inventions in F major, E major and Bb major for 5-octave marimba. The annotations for these transcriptions will include such information as: the interaction between the physical technique, the eye, the ear, and the kinesthetic sense; sticking selection (suggestions provided throughout); and recommended approaches to practicing the more technically challenging passages.

## Chapter 2: A Brief History of Four-Mallet Technique

Initially, music for the concert marimba was an outgrowth of two-mallet xylophone technique, which was primarily linear in nature. When players started using two mallets in each hand, the third and fourth mallets were used for fleshing out linear passages by adding double stops<sup>1</sup> to what was still essentially conceived as two-mallet playing. These new four-mallet parts enabled the players to play three- and four-voiced chordal structures, but the music rarely, if ever, demanded true independence between the two mallets of a single hand.

Clair Omar Musser's etudes in C major and B major, published in 1948, illustrate the early use of four-mallet technique to play music that was conceived as an alternation between left and right hands. The extra mallet in each hand simply allowed for double-stops to be added to the two-mallet line.



**Figure 2.1: Example of use of four mallets to flesh out music that was conceived as a two-mallet line. Clair Omar Musser, *Etude Op. 6, No. 9* mm.8-9.**

In Musser's B and C etudes, the player is never required to play mallet 1 followed by 2, or 3 followed by 4 in rapid succession—either one hand plays a double-stop,<sup>2</sup> or it is immediately

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<sup>1</sup> "Double-stops" refers to the playing of two notes simultaneously and is borrowed from nomenclature used by string players. "Triple" and "quadruple" stops are, respectively, the playing of three and four notes simultaneously.

<sup>2</sup> This study will number the mallets, following the example of Leigh Howard Stevens, in ascending order from left to right (or low to high).

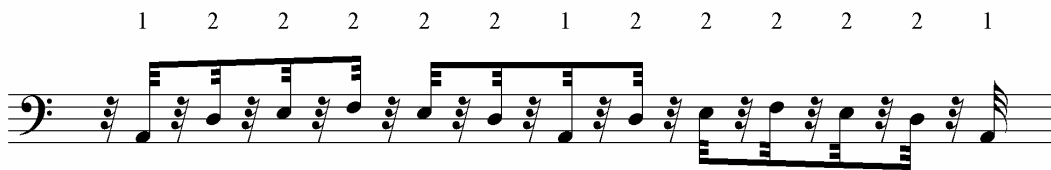
followed by the other hand. Measure 9 of Musser's B Major *Etude* (see Figure 2.1) uses a descending left-hand melody (chromatic, then diatonic) with a tonic pedal in the right hand separating each melodic tone. Musser adds the major third as a double-stop in conjunction with the tonic pedal to thicken the texture—while technically three parts may be heard, only two of the parts are independent. This type of dependence is typical of early uses of mallets 1 and 4.

Subsequent marimba music required the alternation of mallets within one hand, but mostly in limited circumstances where broken chords were found. These circumstances often resulted in a repetitive-sticking sequence such as the 1-3-2-4 "rain" passage of Mitchell Peters' *Yellow After the Rain* (1971) shown in Figure 2.2.

Single-hand linear passages, such as the one at the beginning of the piece, however, were meant to be played by the repetition of a single mallet. Figure 2.3 shows the second statement of this theme (in the left hand).<sup>3</sup>



The use of repetition of a single mallet to play a linear passage in one hand remains a common practice today—although the increasing complexity of marimba literature requires the player to perform this technique with any of the four mallets (including the exterior mallets of each hand). Many contemporary, single-handed linear passages use the extra mallet only when a leap is encountered such as in the ostinato left hand figure near the beginning of Keiko Abe's *Michi for Marimba* (1978) which uses mallet 1 to reach across a leap of a fourth, then follows with 2-2-2... for the subsequent stepwise notes (see Figure 2.4). Leigh Howard Stevens' transcriptions (with sticking suggestions) of selected Bach *Two Part Inventions* utilize a similar sticking rationale (see Figure 2.5 and Figure 2.6).<sup>4</sup>



**Figure 2.4: A single-hand passage (extracted) showing the use of the second mallet to bridge a leap, then continuing with repetition sticking. Keiko Abe, *Michi for Marimba* p. 4 at the *Espressivo* marking [Measures, time signatures and stickings are not present in the Abe text.]**

As the amount and complexity of marimba literature have increased during the past half-century, linear passages for one hand have become much more prevalent and intricate. Contemporary composers (who often are not marimbists) frequently write in a pianistic style, with a more-than-binary conception of independent lines. Add to this fact the expectation that marimbists must be familiar with a substantial body of Bach transcriptions (which are linear minefields) and the result, when combined with our current approach to playing linear passages,

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<sup>4</sup> Both of these figures feature passages from works that will be addressed from an alternation-sticking perspective in Chapter 5 of this study.

creates a difficult environment for the conscientious marimbist who wants to minimize inaccuracy and maximize musicality.



**Figure 2.5: Stevens' use of two mallets to bridge leaps, and one mallet to play scalar passages. J. S. Bach, *Two-Part Invention in F Major* trans. Stevens mm. 1-3. [Stickings from the Stevens text.]**



**Figure 2.6: Stevens' use of two mallets to bridge leaps, and a single mallet to play scalar passages. J. S. Bach, *Two-Part Invention in Bb Major* trans. Stevens mm. 1-2. [Stickings from the Stevens text.]**

As contemporary composers have demanded more technical acuity in the concert hall, marimbists have developed various hand positions to deal with the difficulties encountered in the more challenging literature. Each method of holding two mallets in one hand (these will simply be called "grips") assists the player in overcoming a particular set of problems, while limiting the player's abilities in some other way. All grips hold the inside mallet between the thumb and index finger similar to way one would hold a single mallet. The primary distinction among the grips is the nature, and location, of the external mallet's insertion into the standard single-mallet hand position. The modern Musser grip also, uniquely, requires the palm to be almost perpendicular to floor. The following paragraphs will briefly discuss the three most common grips that are available to the modern marimbist, but a complete discussion of their respective



benefits and liabilities—which could easily necessitate a dissertation in itself—is outside the scope of this study.<sup>5</sup>

The Burton grip crosses the sticks under the palm, inserting the outside mallet over the inside mallet and between the middle and index fingers—the back of the hand is parallel to the ground. The Burton grip is primarily used for the vibraphone and is most comfortable when both manuals ("white" and "black" bars<sup>6</sup>) are in the same plane, although many players also use this grip on the marimba. Two-mallet playing is usually performed by mallets 2 and 4, with a hinge motion in the right hand and a rotating motion in the left hand (similar to the "Traditional" snare drum grip). Players often use repetition of a single mallet on adjacent bars to limit the inter-manual motion of each hand. Initiation of the stroke, in both the inner and the outer mallet, comes from the wrist—lending power, but (in the minds of some performers) limiting true independence within each single hand by constricting the finer muscle control of the fingers.

The "Cross Stick" grip (also called the "Traditional" or "Scissor" grip) is similar in appearance to the Burton grip, but the outside mallet is inserted under the inside. As in the Burton grip, the back of the hand is kept parallel to the ground in the down position. Many players use this powerful grip on the marimba, and it is especially effective for passages with parallel motion in a single hand. Two-mallet playing is usually performed with mallets 2 and 3.

The Musser grip differs from the other two grips in three ways: First, the outside stick is inserted between the middle and ring fingers and grasped firmly with the 2 smallest fingers. Second, both sticks are held at the very end in such a way that they do not cross under the

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<sup>5</sup> David Eyler, interview by author, longhand, Nashville, TN, 18 November, 2001. Eyler's knowledge of four-mallet grips was the primary source for the descriptions in this chapter.

<sup>6</sup> "White" and "black" will be used to indicate marimba bars respective to the white and black keys of a piano.

palm—this allows the fingers and thumb to play a more active role in motivating both sticks. Third, the back of the hand is rotated to an almost vertical position. The fact that these sticks do not cross within the hand both allows the sticks to operate more independently of each other, and allows the mallets to spread to wider intervals. These advantages do, arguably, come at the expense of some of the power afforded by the, more self-supporting, crossing grips. The alternation-sticking techniques and exercises presented in this paper require the use of the Musser grip;<sup>7</sup> consequently the use of this grip will be examined in much more detail in Chapter 3.

This author believes, as do many marimbists, that there are limitations as well as benefits inherent in each of the grips available today. The choice of grip by a player is a personal matter and there are brilliant players who use each of the grips—with a seemingly endless number of subtle variations. This author advocates a strong experiential understanding of all grips and flexibility in choosing a grip that matches a particular piece (or even a single passage). For example, some types of passages, especially those with fast, parallel, wide-interval demands, favor a crossing of the mallets inside the Musser grip (similar to that of the cross-stick grip) over the more common modern version of the Musser grip as described in Stevens' *Method of Movement*.

Limited examples of alternation sticking are already present in the works of some contemporary marimba composers. As will be discussed in Chapter 3, Michael Burritt's narrow-interval techniques are just one small step away from playing alternation sticking and Eric

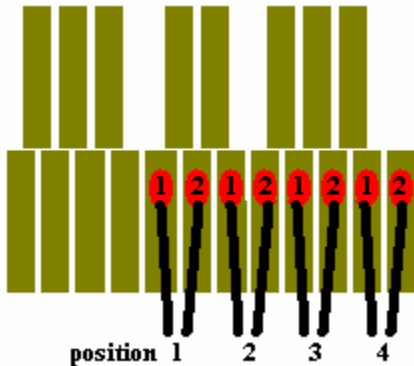
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<sup>7</sup> Cursory experimentation with the Burton grip on the Bach inventions of Chapter 5 (with alternation sticking), show promise; however, for the purposes of this paper, the independence of the Musser grip is strongly favored by this author for the sticking techniques described by this study.

Sammut's works contain several examples of a single hand playing a line with alternating mallets. Leigh Howard Stevens' Bach transcriptions occasionally feature short mordents that use alternating sticks of one hand. Students, and sometimes teachers, may be inclined to dismiss these unfamiliar stickings because the reasoning behind them is out of the ordinary. The serious marimba student who has the time to spend on developing a strong technique will benefit greatly from working on the exercises, etudes, and transcriptions found in the later chapters of this text. The application of alternation sticking used in the etudes and the transcriptions is an organic extension of the narrow-interval technique of Burritt and the independent (but cooperative) lines of Sammut. When the independence is isolated and the technique focused, marimbists may discover a new tool in their technical arsenal.

### Chapter 3: Precursors of Alternation Sticking

This paper addresses one advantage of the Musser four-mallet grip: the ability to play linear passages by alternating the mallets within one hand. At first glance, this appears to be a challenging task as the difficulties associated with single-hand independence increase as the interval between the mallet balls decreases—and playing linear passages with alternating sticking frequently necessitates a spacing of a second between the mallets. For example, playing a left-handed C major scale with alternation sticking (see Figure 3.1) requires the player to set mallets 1 and 2 over C and D, then play C and D; the hand then resets placing mallets 1 and 2 over E and F to play E and F, and so on.



**Figure 3.1: Hand positions for a left-handed C major scale played with alternation sticking.**

While this sticking procedure requires a new hand position for each pair of notes, it reduces lateral arm motions by 50%, in both number and frequency, when compared to the existing practice of repeating a single mallet. Consider the same C major scale played with repetition sticking. Mallet 2 is first positioned over C and plays the C; the same mallet must then be re-set over D striking the D then immediately proceeding to the E, and so on. These resetting motions,

depending upon the tempo, may occur in rapid succession, and require near constant eye contact for maintenance (a particular difficulty in both Bach transcriptions and contemporary literature where the hands may be three to four feet apart). The term “hand position” is often used to describe the hand’s “embouchure.” This paper will contain numerous references to hand positions, but the term will be intended to invoke thoughts of moving the hands into varying playing positions in the fashion used by string instrument and piano pedagogues.

The binary (alternation) approach to the scale is analogous to the way pianists play linear passages: by placing the hand in one position, playing as many notes as possible from that position, then shifting to a new position to continue with the line. In the case of the left-handed C major scale mentioned above, the pianist would play (piano finger numbers now<sup>1</sup>) 5-4-3-2-1, then reset to continue with 3-2-1 in a second hand position. A pianist would find it impractical to play a scale with his index finger, while awkwardly holding the remaining four fingers up in the air, yet this is a metaphorically accurate description of a marimbist using a repeated solitary mallet. It is unfortunate that the marimbist must reset the hand position so much more frequently than the pianist, but such is the unavoidable result of having sixty percent fewer striking digits per hand.

This discussion points to the crux of the issue of sticking—efficiency. The most efficient sticking is the one that minimizes the number of hand positions by using the fewest lateral arm motions. This definition of efficiency in sticking has the satisfying side effect, upon application, of roughly equalizing the number of strokes by each of the four mallets. Beginning two-mallet marimba students are often inclined to use a single hand to play a linear passage. After being

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<sup>1</sup> Finger numbers on the piano are assigned in ascending order from the thumb (1) to the smallest finger (5.) In the left-handed scale discussed here, the numbering will begin with the left-most finger of the left hand—number 5.

encouraged to use both hands, the student will be moving each hand at half the speed of a single hand alone—giving each hand double the time to prepare for its next note (while the opposite hand is playing its share of the line). This is an example of improved efficiency as a direct consequence of using all available digits (specifically, mallets in the case of the marimba). If this two-hand concept is applied to two mallets in a single hand, then the interior and exterior mallets of each hand may alternate to improve efficiency in linear passages that must be played by one hand. The physical difficulty of routinely playing notes a second apart, in each hand of a four-mallet grip is the only obstacle to applying two-handed alternation to the two mallets of a single hand. This very difficulty, and suggested methods of overcoming it, will be the subject of Chapter 4.

While playing such narrow intervals in a single hand appears to be an awkward technique, there are several precedents in contemporary marimba literature. The left hand in Michael Burritt's *Shadow Chaser* (seen in Figure 3.2) is playing in the narrow positions necessary for the use of alternation sticking. Burritt is known for (among other things) the narrow interval demands of his works.<sup>2</sup> Figure 3.3 shows a different narrow-interval-sticking technique frequently used by Burritt. (A similar passage can also be found in the first four notes of the third measure of Figure 3.2). Figure 3.2 and Figure 3.3 illustrate the hands playing with an interval of a second between the inside and outside mallets; however, unlike the Bach and Sammut passages to be discussed below, Burritt always gives a brief pause to reset for the next position. In the first two measures of Figure 3.2 (left hand), this pause takes the form of a repeating break on the third sixteenth of a 3/16 cross-rhythm. (The break is sometimes seen as a sixteenth rest, and

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<sup>2</sup> The term “narrow interval(s)” will be used to refer to “narrow interval(s) within one hand.”

sometimes contained in an eighth note on the second sixteenth note of the pattern—varied for notational simplicity). Figure 3.3 consists of a single line played by both hands, therefore each hand’s part contains a pause while the opposing hand plays its half of the combined line.

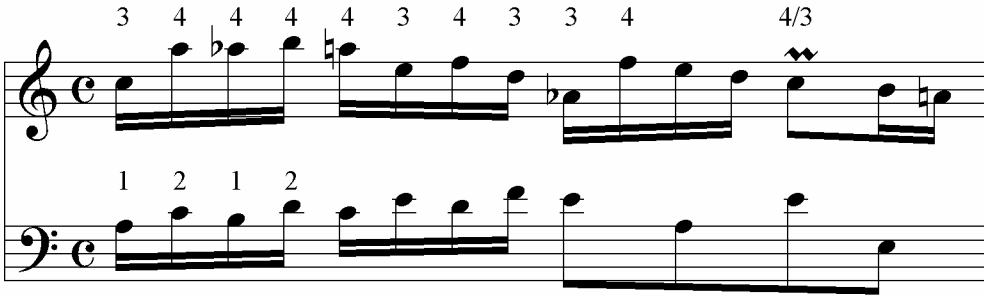


**Figure 3.2: Illustration of narrow interval playing (in the left hand). Michael Burritt, *Shadow Chaser* mm. 46-8. [Sticking suggestions from the Burritt text.]**

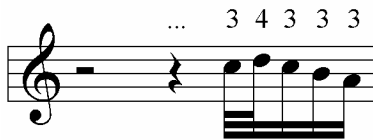


**Figure 3.3: Illustration of narrow interval playing (in both hands). Michael Burritt *Shadow Chaser* mm. 163-4. [Sticking suggestion from the Burritt text.]**

Stevens’ transcriptions (and presumably his amazing recordings) of the Bach inventions use narrow intervals sparingly, but effectively. Figure 3.4 illustrates measure 16 from Stevens’ transcription of Bach’s *Invention No. 1*. The right hand plays an upper mordent on count four that uses alternation sticking. The mordent has been written out in Figure 3.5 to demonstrate the exact motion of the alternation.



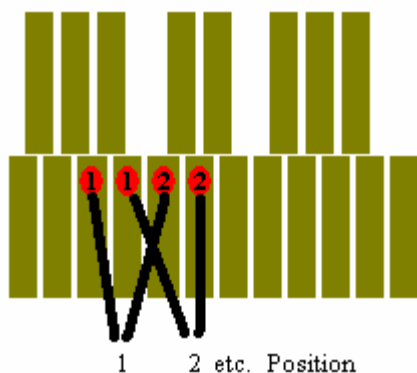
**Figure 3.4: Illustration of narrow interval playing (in both hands). Leigh Howard Stevens, trans. of Bach’s *Invention No. 1*. [Sticking suggestions from the Stevens text.]**



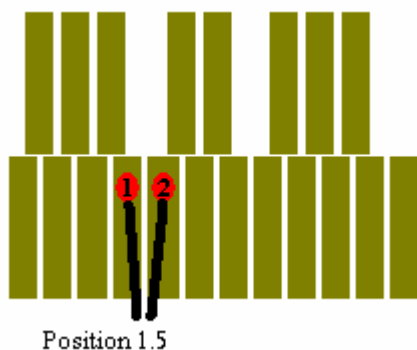
**Figure 3.5: Mordent from Figure 3.4 written out as an illustration of narrow-interval alternation sticking.**

The left-hand part for the first two counts of Figure 3.4 illustrates a different form of narrow-interval playing (and alternation sticking). At first glance the hand positions are ascending positions at the interval of a third (Figure 3.6)—the left hand plays A and C, then B and D. However, there is an intermediate position that places the mallet heads at the interval of a second (shown in Figure 3.7). The intermediate position that places the mallet heads at the interval of a second (shown in Figure 3.7). The intermediate narrow-interval position is set immediately after mallet 1 plays the A and is extant until mallet 2 finishes with the C—at which time the interval between the hands expands back to a third to position mallet 2 over the D. Using this intermediate narrow-interval position allows mallet 1 more time to prepare for its note than does the “locked thirds” approach to the passage. The intermediate position repeats between each subsequent pair of ascending thirds.





**Figure 3.6: Apparent hand positions for first count of the left hand in Figure 3.4.**



**Figure 3.7: Intermediate position between positions 1 and 2 of Figure 3.6.**

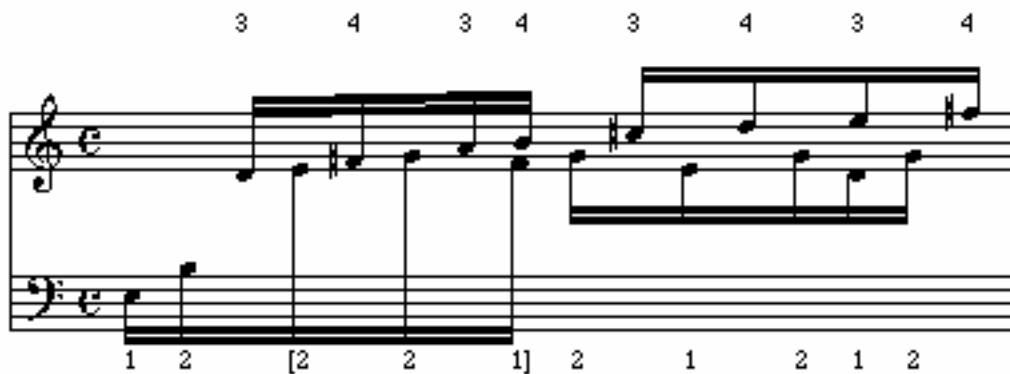
Figures 3.8 through Figure 3.14, and the accompanying text, describe Eric Sammut's use of single-hand alternation sticking to play linear parts. The only difference between Sammut's compositional style, in most cases, interpolates a mallet from the opposite hand between the notes of his line. When playing Bach's keyboard music on the marimba, no such interpolation is present, making the hands truly independent.

In figure 3.8, Sammut's hand sequence is thus: LLRLRLRLRLRLBLR.<sup>3</sup> Only two pairs of notes in this passage (the right hand on the seventh and eighth sixteenths; and the left hand on the eighth and ninth sixteenths) require the alternation sticking to occur between

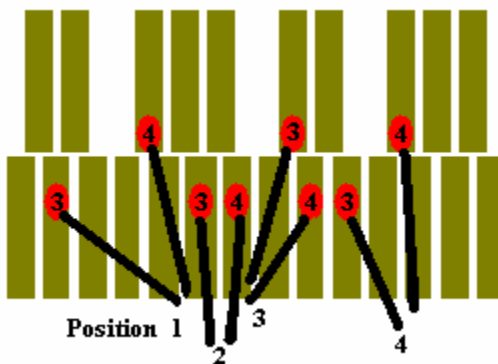
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<sup>3</sup> In this illustration, L=left mallet; R=right mallet; and B=both mallets

consecutive notes at an interval of a second. In the latter half of the measure, the three “LBL” notes actually require the left hand to play three notes in a row, but the notes here are no longer at narrow intervals. The right hand part, when extracted from the passage (of Figure 3.8), outlines a linear passage based on an E dorian scale—and uses alternating sticks to play it. Figure 3.9 shows the four distinct hand positions taken by the right hand to play the passage of Figure 3.8.

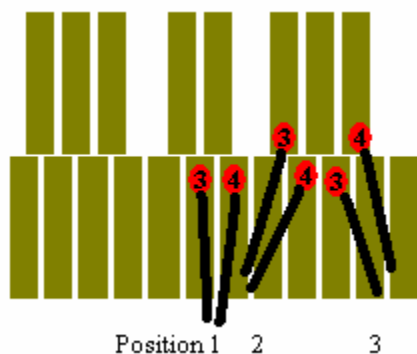


**Figure 3.8:** Illustration of alternation sticking in a composer’s sticking suggestions. Eric Sammut, *4 Rotations for Marimba*: Rotation 3 m. 32. [Stickings from the Sammut text.]



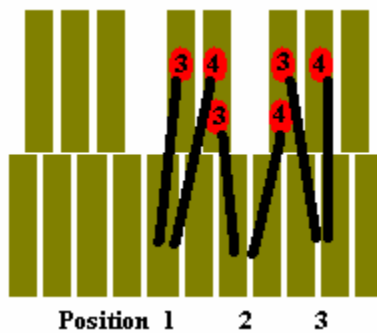
**Figure 3.9:** The four distinct right hand positions required to play Sammut’s stickings in Figure 3.8. Eric Sammut, *4 Rotations for Marimba*: Rotation 3 m. 32.

Sammut routinely uses this alternation-sticking technique in his compositions. Figure 3.10 illustrates a right-hand melody taken from an early portion of *Cameleon*. Note the three positions that are, again, delineated by Sammut’s “3-4” sticking pairs.



Once a player develops some facility with the type of alternation and positional shifting demonstrated in Figure 3.8 and Figure 3.10, there are some additional tools that alternation sticking can provide. Sammut applies, also in *Cameleon*, the same positional concept with alternation applied to a repeating note in order to change positions. In Figure 3.12, on the third and fourth eighth notes, Sammut alternates the mallets on D# in order to prepare for the subsequent F# on mallet 4, then alternates again on the F# to prepare mallet 4 for the upcoming

G#. The positions necessary for these shifts are shown in Figure 3.13, and they are similar to the type of hand positions seen in Figure 3.9 and Figure 3.11, with the exception of the repeating notes. It is important to note (with reference to Figure 3.13) that the actual striking positions of mallet 4 and mallet 3 on the D# and the F# would, in reality, be on the same position of the bar. The *Cameleon* sticking is technically less difficult to perform than the *Rotation 3* passage above because the repeating note reduces the distance of the lateral arm motion.



**Figure 3.13: The three distinct right hand positions required to play Sammut's stickings in Figure 3.12. Eric Sammut, *Cameleon* m.1. [Sticking suggestions from the Sammut text.]**

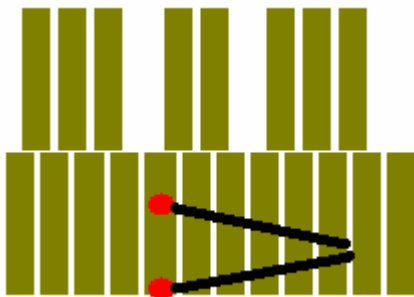
Later in *Cameleon*, Sammut takes the alternation-sticking concept one step further by applying the alternation to a repeating single note. Figure 3.14 begins with a technique similar to that of Figure 3.12, then uses alternating sticks to play three consecutive Eb's between measures 49 and 50. Sammut's approach to sticking in the right hand of Figure 3.14 is, to say the least, uncommon. Most performers would use a sticking such as: 3,3,3,3,4,4,3,3,3,3,3,4,4,3 for the right hand of Figure 3.14. Sammut's recommended sticking suggests a more pianistic approach to hand positions as the alternation on a single note is reminiscent of the way pianists play a quickly repeated note with multiple fingers.

Sammut's right-hand-sticking technique suggests the possibility of rolling on one note, with one hand, in the normal playing position, while the other hand is playing a separate moving part. While there are a couple of techniques for playing a one-handed roll already available to

marimbists, their use requires a radical change of hand position. In execution, the “mandolin roll” requires the player to position the mallet heads above and below the end of the bar with the outside mallet below. The mandolin roll is only possible on the white bars. The traditional form of alternating the mallets on a single bar puts the hand into the position shown in Figure 3.15.



**Figure 3.14:** Use of alternation sticking to change position on a repeating note (first measure), and to play multiple repetitions of a single note (the 3 consecutive right-hand Eb’s that cross the barline). Eric Sammut, *Cameleon* mm. 49-50.



**Figure 3.15:** Hand position for a traditional one-handed roll executed by the right hand.

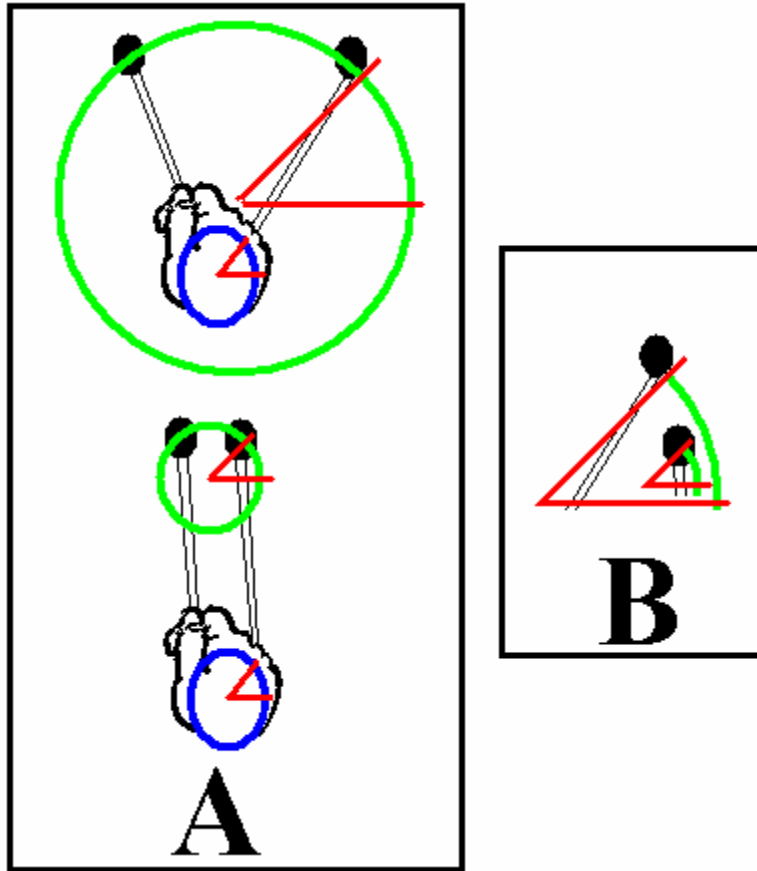
While the type of one-handed roll shown in Figure 3.15 undoubtedly provides the best sound, the logistic requirements of its arm position significantly restrict the freedom of motion in the opposite hand. Using the one-handed roll in the normal playing position, in the fashion of Sammut’s repeating Eb’s above (but in an unmetered roll style), does not give a fast or a strong roll sound. It is, however, surprisingly effective when the other hand is playing a busy passage. The Bach transcriptions of Chapter 5 contain several examples of this application of alternation sticking.

In conclusion, there is only one significant difficulty to playing alternation sticking within a single hand of a four-mallet grip: playing at narrow intervals. As has been shown in this chapter, there are a number of precedents hinting at the necessity for a well-defined narrow-interval playing technique. Chapter 4 and Chapter 5 will present a system combining the right-to-left independence of Bach's contrapuntal style with the narrow-interval playing concepts used by Burritt, Sammut, and Stevens in the examples of this chapter.

## Chapter 4: Training the Hands for Alternation Sticking

The concept of alternation sticking is a simple one, but putting it into practice with two mallets in a single hand presents a troublesome obstacle—in order to play scalar passages, one must place the mallet heads on adjacent bars while maintaining some degree of independence. Sticking sequences that could be comfortably played at an interval of a fifth or a sixth become significantly more awkward when played at an interval of a second. The reason for this awkwardness is a loss of mechanical advantage as the interval between the mallets decreases.

The premise of this paper is that, in most cases, the fingers may compensate for the lost mechanical advantage—the wrist and fingers can work together in a way that is different from that required for wider intervals. The turning wrist causes the mallet heads to describe a segment of a circle in the air. At large intervals (between the mallets), this circle is large, and at small intervals the circle is small (see the green circles of Figure 4.1.A). When the wrist (the blue circle of Figure 4.1) is turned a given angle (shown in red) the result is a long powerful stroke at a wide interval, and a short weak stroke at a narrow interval. Figure 4.1.B places the two stroke lengths together for comparison purposes. The loss of this mechanical advantage, when the circle described in the air is similar in size to the wrist, is the reason for awkwardness when alternating the mallets of one hand at narrow intervals. A marimbist cannot retain maximum independence as the mallet heads of a single hand approach each other, but if the player wishes to increase the role of the fingers in motivating the stick, then simple exercises such as that of Figure 4.2 will begin to strengthen the fingers and help the player to achieve a new relationship between the wrist and the fingers. The player is advised to keep the mallets strictly over the bars to be played (as seen in Figure 4.3) in order to ensure that the correct muscles are trained.



**Figure 4.1: Mechanical advantage and its relationship to intervallic space in marimba grips.**



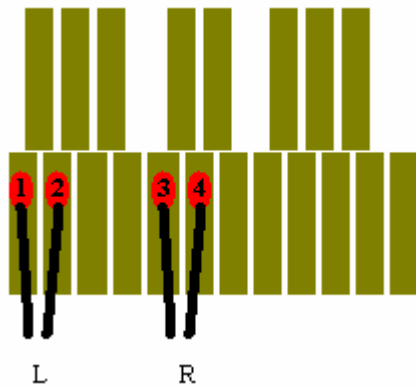
**Figure 4.2: Alternation sticking isolated to two notes a second apart.**

Leigh Howard Stevens describes an exercise in which one hand, with the mallets held at a comfortable interval, is using a single mallet while holding the other mallet as still as possible.<sup>1</sup> Stevens' approach begins with the wrist stroke (rotating around the non-playing mallet) then adds the fingers for accents/articulation. This paper advocates—at least in narrow intervals—the reverse approach: initiating the stroke with the fingers, then adding the wrist as necessary for

<sup>1</sup> Stevens, *Method of Movement for Marimba*, p. 26, in the section entitled "Single Independent Strokes."



dynamics. When beginning with the fingers, Stevens' isolation exercise will require the use of some very specific muscles for each stick. The inside mallet uses the thumb in conjunction with the index finger and the exterior mallet requires the use of the two smallest fingers to alternately lift and push downward on the stick. These are the same muscles described by Stevens for use by intermediate/advanced players for “finger acceleration.”<sup>2</sup>



**Figure 4.3: Hand positions for Figure 4.2**

The first step toward increasing strength in the muscles needed to play at narrow intervals is kinesthetic identification of the specific muscles under discussion. The exercise in Figure 4.4 should be played at a pianissimo level, maximizing the role of the fingers and minimizing wrist motion. The non-playing mallet is held as still as possible—this is accomplished by relaxing the non-playing mallet and conceptualizing the muscles necessary for each mallet as completely independent of the rest of the hand (analogous to the way that the right and left hands are independent of each other in a two-mallet grip). Figure 4.4 should be practiced with increasingly narrow intervals between the mallets while trying to retain the same muscular motions. Before playing the exercise as shown in Figure 4.5, place the mallet heads over the notes to be played. Playing this exercise with the mallet heads farther apart than the bars to be played results in

<sup>2</sup> *ibid.* p. 27.

unnecessary and detrimental lateral wrist motion.<sup>3</sup> For instance, if the passage requires alternation between C and D, the mallets should be placed directly over the C and D and the non-playing C mallet should not "drift" to the B when the D mallet is striking. If this drifting occurs, as a result of too wide an interval between the mallet heads, the wrist must compensate with the above-mentioned lateral motion, causing inaccuracy, discomfort, and frustration.



**Figure 4.4: An exercise to find the finger muscles necessary for one-handed alternation sticking.**



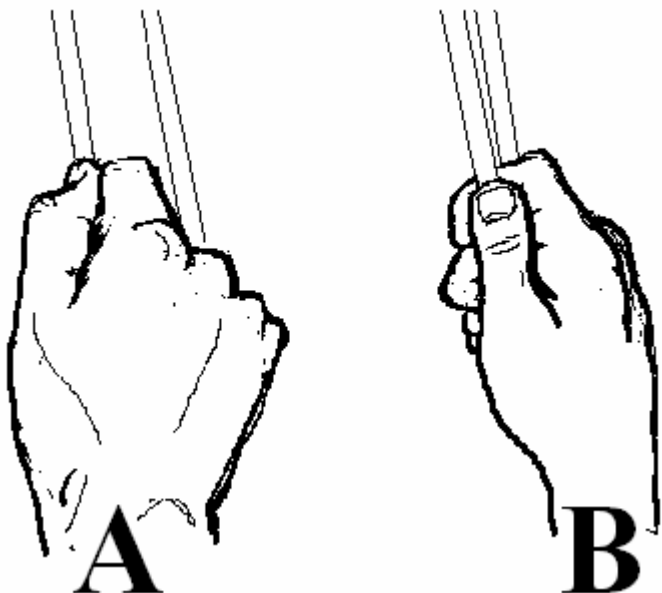
**Figure 4.5: Figure 4.4 with a reduced interval between the mallets—an introduction to narrow interval playing.**

The exercise shown in Figure 4.5 demonstrates the basic physical technique of alternation sticking. The primary goal of the exercises in this chapter is to train the hands to be independent at close intervals.

Up to this point, this chapter has only addressed alternating sticking at a pianissimo level. In order to increase the dynamic level the rotation of the wrist is added to the movement of the fingers. This will result in the appearance and disappearance (from the player's point of view) of the smallest two knuckles of the hand (see Figure 4.6). Figure 4.6.A shows the position of the hand (again, from the player's point of view) after playing the interior mallet, and Figure 4.6.B

<sup>3</sup> This difficulty is similar to the problem faced by some inexperienced snare drummers when they play alternating flams. In an effort to aid the low stroke's rebound to the high position, many students will add a lateral dancing movement with the wrist. The term "dancing flams" is a suggestive description of the problem. While the "dancing" term is a bit facetious, the imagery associated with it is intended to help identify the specific lateral wrist motion in question.

shows the position after playing the exterior mallet. During fast alternation, at an interval of a second, the hand will almost instantly change from one position to the other. Excess "dancing" of the mallets caused by wrist motion resulting from too wide an interval between the mallet heads must be avoided even with the addition of wrist rotation. Correct distance between the mallet heads is a second—attaining this level of control takes some work, but with practice comes a comfortable stability.

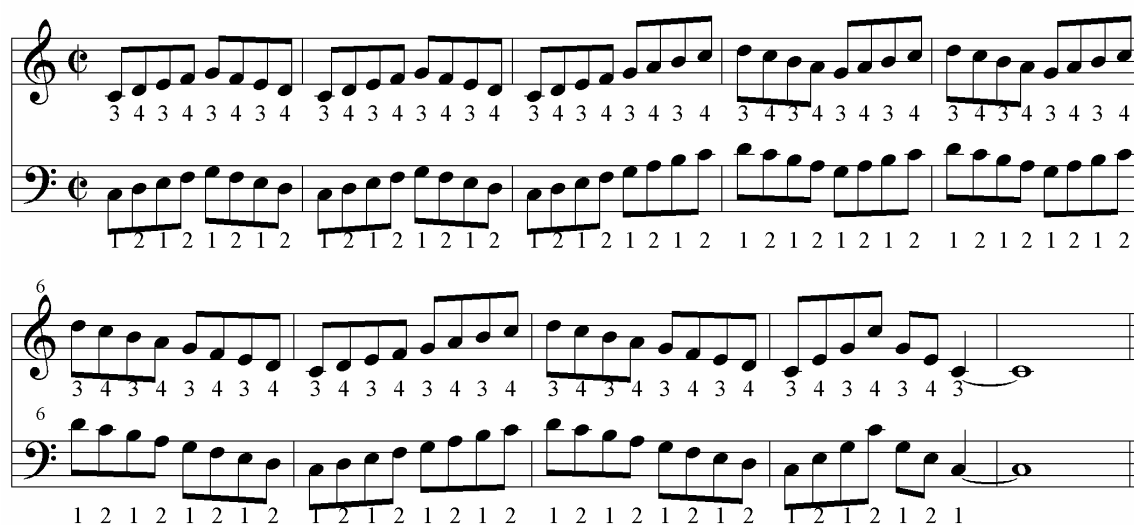


**Figure 4.6: Positions of the right hand at narrow intervals after playing mallet 3 (4.6.A) and mallet 4 (4.6.B).**

Figure 4.7 illustrates the fundamental exercise for developing facility with playing diatonic parts using alternation sticking—and it functions well as a daily "warm up" for the hands. The exercise shown in Figure 4.7 should first be played by each hand alone in the key of C (the key of the example). Later, transposition to all keys will ensure facility with all necessary sequences of right-angled, left-angled, and flat hand positions.<sup>4</sup>

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<sup>4</sup> For a definition of these terms, please see the third subsequent paragraph.



**Figure 4.7: Fundamental exercise to train hands for narrow-interval playing.**

First-time users of alternation sticking will experience a common obstacle when attempting the exercise in Figure 4.7—the use of non-continuous lateral arm motion. If the right hand were to use mallet 3 alone on this exercise, a fluid lateral motion would need to be maintained by the arm. With alternation sticking, however, the notes must be perceived in groups (usually manifested as pairs) and the arm must move with a stop-and-go motion between the groups’ hand positions. The connection between groups/pairs of bars (or hand positions, to say it another way), in any given key, is an interesting spatial/kinesthetic study and can actually lend itself to greater stability of line—once the stop-and-go motion is mastered.

When choosing an alternation-based sticking sequence, the player must first divide the passage into pairs (or small groups) of bars that can be played from a single lateral arm position—much the same way that a pianist or a string player must choose which hand positions will be used and when the appropriate shifts will occur. Essentially, a marimbist, while engaged in alternation sticking, plays in many rapidly shifting hand positions. Each of these positions contains an anchor note and at least one other note (identified by its intervallic distance from the

anchor note).<sup>5</sup> The mallet to play the anchor is set over the anchoring bar at the same time that the interval between the mallet heads is set for the intervallic distance to the first non-anchor note. Any subsequent notes played from that hand position (repetitions, for example) do not require any further visual attention from the player—provided that the anchor is, both mentally and physically, maintained and the intervals of any additional non-anchor notes can be found through kinesthetics from the anchor. In hand positions with only two notes, the anchor is usually the lower note of the position when ascending, and the upper note when descending—or, to say it another way, the first note played. Diagrams for these simple hand positions (with only two notes) will, in the interest of simplicity, omit the anchor indications; however, later, and more complex, positions will use a golden "A" to indicate an anchor note. In entirely scalar passages, the interval between the anchor and the other note in the hand position is always a second (or a negative second—see Subheading 0 below). It is important to remember that the anchor is not necessarily a more dynamic note, but merely a mental "rallying point" for the hands.

When grouping scalar passages into pairs,<sup>6</sup> each pair of bars will fall in one of three orientations: Left-angled, Right-angled, or Flat. The Flat pairs consist of two bars from the same manual—two white or two black bars. The Left-angled and Right-angled pairs have one white and one black bar and are named for the direction the wrist and elbow must move to play the pair (this results in the name equating with the relative position of the black bar). The pairings from each diatonic scale generate a unique sequence of these positions. When starting

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<sup>5</sup> The term, "anchor" is an original term used to denote a mental construct that will be used as a logistical aid throughout this study.

<sup>6</sup> Pure scalar passages rarely use complex hand positions (those with more than two notes per position.) Some notable exceptions will be discussed later in this chapter.

with the left-most mallet (of either hand) and playing one octave, the sequences of hand positions are shown in Table 4.1 for all major keys.

**Table 4.1: The note pairings and orientation of hand positions for major scales (when starting with mallet 1 in the left hand, or 3 in the right hand).**

<u>KEY (Dorian):</u>	<u>PAIRINGS:</u>				<u>ORIENTATION OF PAIRINGS:</u>			
C	CD	EF	GA	BC	F	F	F	F
C#	C#D#	E#F#	G#A#	B#C#	F	R	F	R
D	DE	F#G	AB	C#D	F	L	F	L
Eb	EbF	GAb	BbC	DEb	L	R	L	R
E	EF#	G#A	BC#	D#E	R	L	R	L
F	FG	ABb	CD	EF	F	R	F	F
F#	F#G#	A#B	C#D#	E#F#	F	L	F	R
G	GA	BC	DE	F#G	F	F	F	L
Ab	AbBb	CDb	EbF	GAb	F	R	L	R
A	AB	C#D	EF#	G#A	F	L	R	L
Bb	BbC	DEb	FG	ABb	L	R	F	R
B	BC#	D#E	F#G#	A#B	R	L	F	L

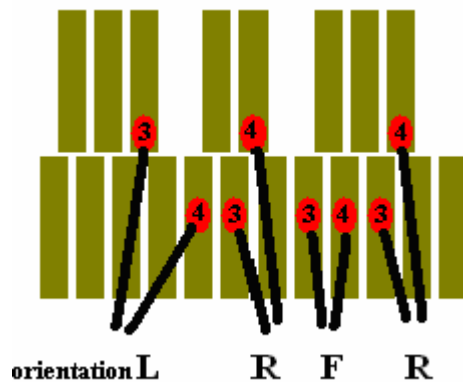
Legend:

- L = left angle (black bar then white bar)
- R = right angle (white bar then black bar)
- F(Flat) = no angle (two black bars or two white bars).

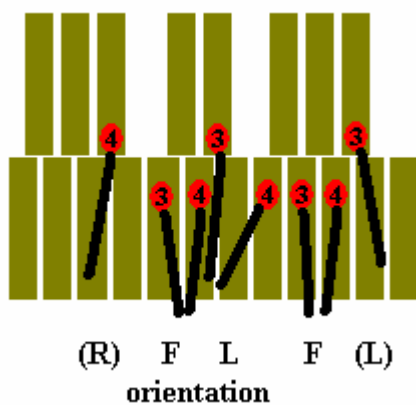
The pairing sequences of Table 4.1 should be practiced in all twelve major keys in order to attain facility with the relevant (diatonic) sequences of flat, left-angled, and right-angled pairs. In the key of Bb, for example, the pairings are shown in Figure 4.8. The orientation sequences of Table 4.1 cover all permutations encountered in major diatonic scales, provided the line is ascending and the left-most mallet of the hand is on the tonic, or the line is descending and the right-most mallet is on the tonic.<sup>7</sup> The remaining possible permutations of sequences are to be found by

<sup>7</sup> “Left” and “right”, in this context, refer to the mallets of a single hand.

reversing the sticking within each hand. For instance, the Bb scale of Figure 4.8 would produce a different sequence of orientations if the scale began with the right-most mallet as in Figure 4.9.



**Figure 4.8: A diagram of the Bb major scale pairings and hand position orientations.**



**Figure 4.9: A diagram of the "reversed" Bb major scale pairings and hand position orientations (parentheses indicate pairings if completed with the adjacent scale tone).**

The player chooses between the two pairing sequences as the needs of the music change. When playing alternation sticking on any passage in the key of Bb major (or G natural minor, F mixolydian, C dorian, etc.), for instance, the player will have to choose between the pairings sequences of Figure 4.8 or Figure 4.9. The interaction between the melodic shape of a scalar passage and the black-to-white bar shapes on the physical keyboard is of prime consideration for sticking choice. A two-octave Bb-major scale might begin with the sticking of Figure 4.8 and

(on the last note of Figure 4.8) continue into the sticking of Figure 4.9, thereby using both pairing sequences.

In order to prepare for both permutations in each scale shape, this author suggests that the player—instead of simply reversing the sticking for the scales featured in Table 4.1, which is certainly a useful exercise—combine the sticking reversal with the practice of dorian modes. A right-hand C dorian mode, if begun with mallet 3, contains exactly the same pairs as the ascending Bb major scale shown above in Figure 4.9. Table 4.2 shows these dorian pairings for all keys. It is interesting to note that, of Table 4.2, only four keys (D, F, C, and C#) have sequences in the "Orientation of Pairings" column that may be found anywhere on Table 4.1—the remaining eight are unique sequences.

**Table 4.2: A table showing the note pairings and orientation of hand positions for Dorian scales (when starting with mallet 1 in the left hand, or 3 in the right hand).**

<u>KEY (Dorian):</u>	<u>PAIRINGS:</u>				<u>ORIENTATION OF PAIRINGS:</u>			
D	DE	FG	AB	CD	F	F	F	F
Eb	EbF	GbAb	BbC	DbEb	L	F	L	F
E	EF#	GA	BC#	DE	R	F	R	F
F	FG	AbBb	CD	EbF	F	F	F	L
F#	F#G#	AB	C#D#	EF#	F	F	F	R
G	GA	BbC	DE	FG	F	L	F	F
Ab	AbBb	CbDb	EbF	GbAb	F	L	R	F
A	AB	CD	EF#	GA	F	F	R	F
Bb	BbC	DbEb	FG	AbBb	L	F	F	F
B	BC#	DE	F#G#	AB	R	F	F	F
C	CD	EbF	GA	BbC	F	L	F	L
C#	C#D#	EF#	G#A#	BC#	F	R	F	R



As a basic training exercise for scalar alternation sticking, the exercise of Figure 4.7 is deficient in that it excludes all but the first of the "dorian mode" pairs described in the previous paragraph.<sup>8</sup> For this reason, the exercise of Figure 4.7 should be practiced in both major and dorian modes. After a player has practiced the scales of Table 4.1 and Table 4.2 (and/or the exercise of Figure 4.7) all of the possible diatonic scalar note pairings and pairing sequences will have been encountered.

In addition to being an excellent vehicle for the learning of diatonic note pairings, the exercise of Figure 4.7 has the added benefit of containing matching tonic and dominant pentachords in both the major and dorian modes.<sup>9</sup> After playing through the exercise in all twelve dorian permutations, each minor pentachord will have been played twice (once as a tonic pentachord and once as a dominant pentachord)—as in the original exercise the major pentachord was played twice in each cycle, respectively.

In a specific instance, the first two-and-a-half measures, as written, contain nothing but C major pentachord material, and from the middle of the third measure to the middle of the sixth measure, the exercise moves up and down on nothing but a G major pentachord. As the player transposes the entire exercise, the G major transposition will eventually be reached—at which time, the G major pentachord will be found at the beginning. The G major (pentachord) shape is thereby reinforced by a second encounter when the player cycles through all twelve keys. The C major pentachord, incidentally, would be experienced in the dominant position of the F major transposition of the exercise. This redundancy reinforces a crucial skill in the player's

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<sup>8</sup> The "first dorian pair" that is included is the highest pair where the scale ascends into the second octave (switching the mallets after passing the upper tonic).

<sup>9</sup> In the major mode the tonic pentachord (Do Re Mi Fa Sol) and the dominant pentachord (Sol La Ti Do Re) are both major pentachords. In Dorian both pentachords are minor (Do Re Me Fa Sol) and (Sol La Ti Do Re). The Aeolian mode has a minor tonic pentachord; but a Phrygian dominant pentachord (it also, in comparison with the major mode, contains redundant pairings).

development of alternation sticking: familiarity with all diatonic sequences of left- and right-angled pairs. Familiarity with these pair sequences assists the alternation-sticking marimbist in much the same way that scale study assists any musician in sight-reading.

It is helpful to realize that not all scalar left-angled, or right-angled, positions are equal in wrist and elbow orientation. For example, compare the position for E# and F#, to the position for E and F#. The half-step interval requires a much more pronounced angle to the right than does the whole-step angle. While this may seem obvious in this isolated example, this author has found the conscious awareness of this concept to be of considerable assistance in the application of alternation sticking to contrapuntal passages—especially those requiring non-octave parallel motion between the hands.

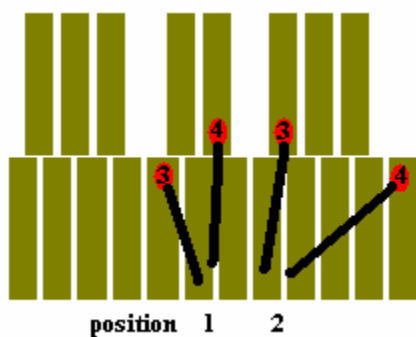
#### **4.1 Arpeggios and Alternation Sticking**

This chapter has, to this point, dealt primarily with scalar passages, but many linear passages contain arpeggiation as well. Arpeggiated passages may be played with alternation sticking by simply following the same procedures used for scalar passages. Figure 4.10 shows an alternation sticking variation of a common exercise used to teach triads and seventh chords to young players. The sticking marked in Figure 4.10 is for mallets 3 and 4 alone, but it should also be played by the left hand (mallets 1 and 2), and in unison octaves. As all exercises of this type, it should be practiced in all twelve keys. Figure 4.11 shows the two hand positions for measure 3 of the arpeggio exercise depicted in Figure 4.10. Hand position 1 is set for the first two notes. After playing the Eb, the hand must shift to the right into position 2 where it will play the third, fourth and fifth notes. If performed correctly, each half measure has only two hand

movements—and these movements, when complemented by kinesthetic sense and muscle memory are not at all difficult.



**Figure 4.10:** Alternation sticking applied to a simple arpeggio exercise.



**Figure 4.11:** The two distinct hand positions for measure 3 of Figure 4.10.

The seventh chord portion of the arpeggio exercise is a bit more difficult in that it contains a crossing mallet in the second position. For an in-depth discussion of this crossing technique, see Figure 4.15 (and the accompanying text) under the sub-heading, "Negative Intervals" in the next section of this chapter.

## 4.2 Positional Playing as a Result of the Use of Alternation Sticking

Several simple positions have been discussed in the preceding sections. These simple positions contain only two notes, one of which may be considered an anchor. The anchors of these simple positions will be ignored in most of the analysis of this paper. Their importance lies in being a focal point for the placement of the hand position, and a point of reference for the interval between the two mallets of one hand, that identifies the non-anchor mallet. In an ideal situation, the hand will place both its mallets over the notes for a simple position before either note is actually played—in this case, it makes little difference which of the two notes is chosen for the anchor. In non-ideal situations, and for more complex positions, the player must choose the most convenient note for an anchor. Subsequent paragraphs in this section will address several frequently encountered complex positions and the ways in which anchor choice may assist the player's kinesthetic sense.

The image displays two systems of musical notation for a mallet instrument, likely a xylophone or maracas, in 2/4 time. Each system consists of a treble and bass staff. The first system contains measures 1 through 12, and the second system contains measures 13 through 23. Each measure is divided into two parts by a vertical blue line, representing the positions of the two mallets. Yellow triangles are placed on the notes to indicate the mallets' positions. Below each staff, stickings are written as numbers 1 and 2. In the first system, the stickings for the treble staff are 3 4, 3 4, 3 4, 3 4, 3 4, 3 4, 3 4, 3 4, 3 4, 3 4, 3 4, and 3 4. The stickings for the bass staff are 1 2, 1 2, 1 2, 1 2, 1 2, 1 2, 1 2, 1 2, 1 2, 1 2, 1 2, and 1 2. In the second system, the stickings for the treble staff are 3 4, 3 4, 3 4, 3 4, 3 4, 3 4, 3 4, 3 4, 3 4, 3 4, 3 4, and 3 4. The stickings for the bass staff are 1 2, 1 2, 1 2, 1 2, 1 2, 1 2, 1 2, 1 2, 1 2, 1 2, 1 2, and 1 2. The measures are numbered 1 through 23 in blue at the bottom of each staff.

Figure 4.12: Analysis of the hand positions and anchors for the exercise in Figure 4.7.

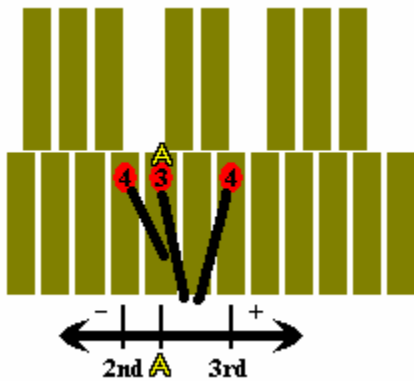
The exercise of Figure 4.7 contains many simple positions and these may be seen in Figure 4.12. The very simplest of the two-note positions are shown in the boxes labeled (in blue): 1, 6, 7, 13, 14, 16, 17, 19, 20, and 23. All of these positions consist of two notes and no repetition. Although later discussions will ignore the anchor in these scalar, dyadic positions, the anchors have been included here as an introductory illustration. Positions numbered: 3, 5, 9, 11, 15, and 22 show positions that alternate, without arm movement between two notes. Position 21 is closely related to the previous set of positions except that after playing its first note, mallet 4 and mallet 2 must expand their intervals (from the anchor) to a third in order to play the last note. The remaining complex positions (numbers 2, 4, 8, 10, 12, and 18) will be discussed in the next section.

### **4.3 Negative Interval Positions**

Negative intervals occur when a non-anchor mallet must reach for a single note past an immediately returning anchor. The interval between the anchor and the crossed note is usually a second. Take, for example, this series of notes (see Figure 4.13) played by the right hand: E, C, B, C, E. The hand sets for the E (mallet 4) and the mallet 3 anchor on C, then mallet 4 crosses under the anchor mallet to play the B, after which the anchor returns (mallet 3 again), and mallet 4 completes the series by playing the final E.

As may be seen in Figure 4.13, the naming of intervals around the anchor is allegorically similar to the naming of numbers around zero on a mathematical number line. The notes played by mallet 4 may be described by the sequence of intervals between them and the anchor—namely, 3rd, -2nd, and 3rd. The distance from the C to the B is clearly a second, but the fact the second is across the anchor effectively negates the interval, adding to the distance mallet 4 must

travel in much the same way that a negative number on a number line is more distant from a positive integer than the absolute value of the positive integer. These negative intervals will be extremely important in the Bach transcriptions of Chapter 5, and have already been encountered in Figure 4.7 and Figure 4.10. These two examples will be addressed by the next two paragraphs.



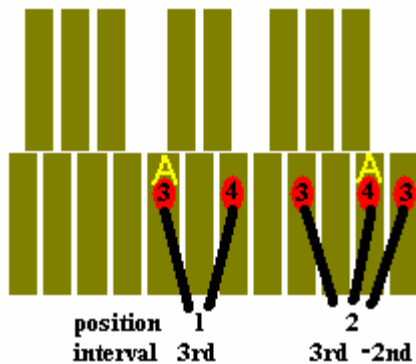
**Figure 4.13: Negative interval illustration (with number line).**



**Figure 4.14: Excerpt from measure 1 (right-hand) of Figure 4.7, showing five notes played in one hand position.**

The five notes of Figure 4.14 are all played in one hand position with mallet 4 playing the "anchor" note (the F) and mallet 3 playing the sequence of intervals: 2nd, -2nd, and 2nd. These notes are found in position 2 of Figure 4.12. All of the points where the melody turns from ascending to descending in the exercise of Figure 4.7 (position numbers 2, 4, 8, 10, 12, and 18 in Figure 4.12) use the same type of negative-interval position. Note that since crossing the anchor is what produces a negative interval, the negative interval in this example lies to the right of the anchor note.

The arpeggio exercise of Figure 4.10 contains a negative-interval position in all of the second hand positions in the seventh chord measures. To play a negative interval past an outer mallet anchor (as seen in position 2 of Figure 4.15), lift the outer mallet out of the way with the same turn of the wrist that brings the internal mallet downward. Then simply return to the original anchor position by reversing the wrist motion. The best results are achieved when the inside mallet (3 in this case) is deliberately lifted before the first anchor strikes and, again, after the second anchor strikes.



**Figure 4.15:** The two distinct hand positions for measure 5 of Figure 4.10.

Negative intervals beyond a second—or a third, in rare cases (such as the fully diminished seventh chord<sup>10</sup> of the final measure of Figure 4.10)—are too wide to allow for accurate retention of the anchor. Wider negative-interval passages, therefore, must be addressed by some other means—usually by an additional hand position. Some of the exercises of this chapter will include wide negative intervals for training purposes. The intention of these wide intervals is to "over-train" the hands in much the same way that a baseball player might use a weighted bat to improve his swing.

<sup>10</sup> Although written as an augmented second (Bbb to C), this interval must be considered, respective to technique, as a third.

It is important to remember that the anchor is merely a mental construct. Physically, the hand cannot keep the anchor mallet precisely above the anchor bar while playing a negative interval, but the ability to use a minimal shift of the hand followed by an equal, and perfectly opposite, returning shift is a relatively simple skill to acquire.

#### **4.4 Springing Positions**

When a passage begins with a negative second interval, it will be called a springing position. The term refers to the sensation of performing such a technique. For example, a short sequence of bars such as E, D, C where D is the intended anchor must, if alternation-sticking principles are applied, either begin or end with a negative interval. Placing the negative interval at the beginning allows the player to use the time preceding the three notes to set the hand with the anchor mallet, mallet 4 if the right hand, lifted and ready to spring downward to strike its D while mallet 3 plays the E that precedes the anchor. The sensation before the first note is very much like a snake that is coiled and ready to strike. The usefulness of this type of position will be seen in the annotations of Chapter 5.

#### **4.5 Transferred Anchors**

Simply stated, the transferred anchor technique is the mental shifting of the anchor from one note to another within a single hand position. This technique is most helpful when the eyes are busy following the opposite hand and the specific interval of transfer is easy to find without the eyes' help. Transferred anchor positions are considered complex positions, but are essentially two (or more) simple positions that are mentally linked for the sake of convenience—usually because the linking aids the player in the control of performance logistics.



Generally speaking, transferred anchors will fall into one of two sub-categories: Chained anchors—where the anchor is transferred from one mallet to the other; or Sliding anchors—where the anchor note changes but the mallet playing it does not.

While a number of complex positions use transferred anchors within the position, most consecutive simple positions will use either a chaining or a sliding relationship as a bridge between the two positions. For clear examples of these types of connections see Annotation vi of Bach's F Major invention (chained-anchor connection), and Annotation i of his C Minor Prelude (for a sliding-anchor connection between positions 3 and 4) in Chapter 5. The C Minor Fugue of Chapter 5 has one position that uses both chained and sliding anchors within a single position—see Annotation vi of that Fugue.

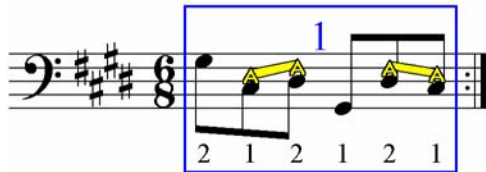
#### **4.5.1 Chained Anchors**

The chain effect of this type of position is produced by the transfer of the anchor from one mallet to the other of a single hand without shifting position. The chaining of the anchors allows the non-anchor notes of the position to change to the opposite side of the anchor. For example, if mallet 1 is anchored on a C, then all the non-anchored notes will be played by mallet 2 (above the C—except for occasional small negative intervals). The anchor may be transferred to mallet 2 on the neighboring D, which allows mallet 1 to play non-anchored notes below the D that would have been unreachable by mallet 2 with the original anchor. Chained anchor positions work best when the interval of transference is a comfortable one for the player. Players may develop a repertoire of "comfortable" intervals through diligent practice.

The second is a common interval of transference and is easily made comfortable by such exercises as that of Figure 4.16.



**Figure 4.16:** An ostinato pattern for the training of chained anchors with an interval of transference second.



**Figure 4.17:** Positional analysis of Figure 4.16

The hand begins at a fifth interval (when playing the exercise of Figure 4.16). After mallet 2 plays the G#, it moves down to the D# (adjacent to the anchor) while mallet 1 plays its C#. The anchor is mentally transferred to the D# even before mallet 2 plays the new anchor and mallet 1 opens up to a fifth interval below the new anchor. The process is performed in the opposite direction to prepare for the repeat of this ostinato pattern. This exercise is built from the actual left-hand part of measures 41 and 42 of Bach's *Two-Part Invention in E Major*. Annotation xiii of the E Major invention discusses the passage in greater detail—see Error! Reference source not found. and the accompanying text.

#### 4.5.2 Sliding Anchors

Sliding anchors work in much the same way as transferred anchors, but the non-anchor notes after the slide remain on the same side of the anchor as before the slide. Sliding anchors are almost always an interval of a second apart, but there may be interposing notes from the non-anchor mallet. When the anchor transfers directly from one note to another, the sliding will be said to be consecutive. When the non-anchor mallet interjects notes between the previous and new anchor, the position will be termed a non-consecutive sliding anchor position. The best way

to understand the need for these positions is to see how they are used in the Bach transcriptions. For analysis of selected sliding-anchor positions, see Annotation vii of the F Major invention, Annotation v of the C Minor Fugue, and Annotation ix of the E Major invention (non-consecutive).

#### **4.6 The Conception of a Four-Mallet Grip as Two Independent Two-Mallet Entities**

A convenient tool in the training of the hands for narrow intervals is to conceive the two mallets in each hand as two separate hands. Assistance in developing this binary concept within each hand may be found in the playing of two-mallet pieces with the two mallets of a single hand, as suggested in the Morris Goldenberg examples below. The playing of two-mallet pieces with a single hand is one of the best methods for training the hands to play independent linear voices within contrapuntal textures. Even if the speed must be reduced, the experience gained in phrasing, balance between the mallets, and positional movement will directly improve the player's independence when similar passages are encountered in four-mallet playing. Edward Kozak's "Etude(s) for a Single Hand"<sup>11</sup> are a pair of wonderful little pieces that use this isolation technique as a pedagogical study for each hand on the marimba. Here again, we may compare the one-handed etude to the pedagogical methods and literature of the piano which feature numerous examples of single-handed etudes and even entire concerti for the left hand alone (for instance, that of Ravel). With this idea in mind, a player could study, for instance, the Goldenberg etudes found in *Modern School for Xylophone Marimba Vibraphone* by applying left and right stickings to the left and right mallets of a single hand. Figure 4.18 shows a passage from Etude I as it might be played with two hands. Figure 4.19 then shows the same excerpt as

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<sup>11</sup> Edward Kozak, *Etude for a Single Hand* [Left and Right versions], Unpublished, From the private collection of John Raush.

an exercise for alternation sticking—the two mallets of a single hand now play the passage that had been intended for two hands. This exercise is recommended to be played in both hands (as shown in Figure 4.19) and is intended to prepare the hands for such independent linear passages as those found in the music of J. S. Bach.



**Figure 4.18: Right and Left alternation sticking in the first of Goldenberg's 39 Etudes; measures. 7-9 (p. 62 of *Modern School for Xylophone Marimba Vibraphone*).**



**Figure 4.19: The two possible alternate-sticking sequences implied by Figure 4.18 when used as a training exercise for alternation sticking.**

Generally speaking, the sticking practices used for efficient playing with two hands may be applied to the two mallets of a single hand, however a few allowances must be made for the limitations of a single hand. The physical logistics of Goldenberg's entire etude require quite a few exceptions to the alternation rule, regardless of whether it is played by two hands, mallets 1 and 2, or mallets 3 and 4. Figure 4.21 is a transcription of the entire etude for the left hand.

#### 4.6.1 Rudiments

As a binary concept of sticking within each hand is developed, the snare drum rudiments should not be overlooked as an existing canon of training materials for binary sticking. The roll rudiments may be used to train the hands for unavoidable repeated notes. The flam rudiments are useful as ornaments or, with double-stops substituted for acciaccaturas, they become quite

idiomatic for the marimba. Ruff<sup>12</sup> (and drag) rudiments are essentially very short segments of the longer rolls and may be used to train the hands for passages where a single repeated sticking is needed. Figure 4.20 shows the Ruff as it might be applied to Murray Houllif's *Estudio No. 4 para Marimba*.<sup>13</sup> Note that the parentheses of Figure 4.20 show ruffs between the left and right mallets of each hand: (1,1,2) is a “right” ruff within the mallets of the left hand, and (4,4,3) is a “left” ruff in the mallets of the right hand.

While rudimental exercises on the marimba can certainly benefit players at all intervals, for the purposes of this paper, the author recommends practicing the rudiments within a single hand at an interval of a second. The (inclusive) exercises between Figure 4.22 and Figure 4.34 demonstrate rudimental-sticking sequences combined with narrow-interval sticking and the positional concepts enumerated earlier in this chapter.



**Figure 4.20: The Ruff sticking sequence (in parentheses)—as applied to Houllif's *Estudio No. 4 para Marimba* m. 4.**

This author has composed each of the following rudimental exercises by choosing a collection of pitches, then experimenting with a particular rudimental sticking sequence until a pleasant-sounding and technically useful effect was achieved. Players wishing to develop the techniques of this study, or any other technique, would benefit greatly from creating personalized exercises in much the same manner.

<sup>12</sup> Rudiment terms are taken from the Percussive Arts Society website: <http://pas.org/Publications/rudiments.cfm>.

<sup>13</sup> The sticking of Figure 4.20 varies slightly from that recommended by Mr. Houllif.

2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1

2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1

3 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1

6 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1

9 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1

11 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1

13 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1

15 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1

**Figure 4.21:** Goldenberg's Etude No. 1 (from *Modern School for Xylophone Marimba Vibraphone*) transcribed for left hand alone.









**Figure 4.30: Narrow interval scalar exercise utilizing the Fifteen Stroke Roll sticking sequence.**



**Figure 4.31: Narrow interval scalar exercise utilizing the Seven Stroke Roll sticking sequence.**



**Figure 4.32: Narrow interval scalar exercise utilizing the Ruff sticking sequence.**



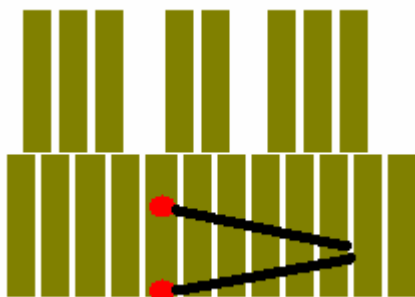
**Figure 4.33: Narrow interval scalar exercise utilizing the Triple Ratamacue sticking sequence.**



**Figure 4.34: Narrow interval scalar exercise utilizing the Drag Paradiddle No. 2 sticking sequence.**

#### 4.6.2 Single Note, One-Handed Rolls

Long tones in the contrapuntal music of Bach present a particular difficulty in solo transcriptions for the marimba. If the opportunity exists, the player may turn the hand to the side and play a one-handed roll in the familiar position shown in Figure 4.35.

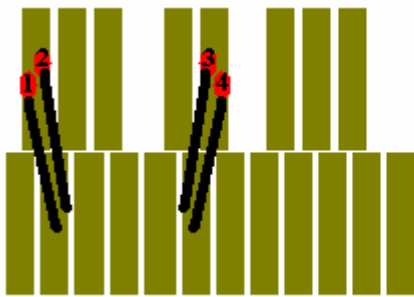


**Figure 4.35: Position for traditional single note, one-handed roll.**

There are a significant number of times, however, when this hand position is impossible for logistical reasons and a marimba transcriber must leave a sustained note to the audience's imagination. Alternation sticking suggests a second option for this problem. The same physical technique that is used to perform alternation sticking at a second (or a negative second) interval can be applied to a unison position. This position is aided by the natural discrepancy in the reach of the two mallets (the inside mallet reaching slightly farther than the outside). To roll on a single note from the standard hand position in the right hand, mallet 3 plays slightly above the center of the bar and on the left side, while mallet 4 plays slightly below the center of the bar and on the right side—it is helpful to assist the natural length discrepancy by slightly angling the

wrist inward (see Figure 4.36). From the position in Figure 4.36, the fingers and wrist simply perform an unmetred single-stroke roll using the same technique described above for narrow-interval playing.

This roll technique is incapable of the volume and speed that may be reached by the traditional one-handed roll position of Figure 4.35 above. It does, however, provide an option to the transcriber other than leaving the sustain of an awkwardly positioned long tone to the imagination of the listener. In the lower register, where roll speed need not be so fast, or when the roll is dominated by a moving part in the other hand, this technique is surprisingly efficacious. This roll technique may be found in the E major and the Bb major Bach inventions of Chapter 5.



**Figure 4.36: Mallet head position for single note, one-handed roll in normal hand position.**

#### **4.6.3 Preparation for the Contrapuntal Style of J. S. Bach**

This section consists of exercises designed specifically to prepare the marimbist for Bach's linear counterpoint style. Many of these techniques will additionally be applicable to non-Bach settings.

Many Baroque pieces use a type of aural illusion to simulate a second part for a monophonic instrument or line. The simplest way to achieve this effect is to alternate (usually within a sixteenth note pulse) between a chord tone (or pedal tone) and a melody. Figure 4.37 illustrates a typical Bach usage of this compositional technique from the beginning of the fugue

portion of his *Tocatta and Fugue in D minor*. Mallet 4 plays a pedal A on the second and fourth sixteenth notes of each beat, while mallet 3 plays, what sounds like, a steady eighth note melody beginning with the second eighth note of the first measure.

In the musical example of Figure 4.37, Bach is writing between a melody that is half as fast as the sixteenth note “motor” rhythm he wants to use—therefore, every other note is a part of the melody and the music provides a marimbist with a graceful alternation between a melodic mallet and a pedal-tone mallet. When Bach uses a melody that is a quarter the pace of his chosen motor rhythm (as seen in Figure 4.38), he often chooses to decorate the pedal with a neighboring tone. This is a technique frequently used in Baroque contrapuntal music to decorate the alternation between a pedal tone (or chord tone) and a slower melody. Bach's examples of this type of alternation rarely last longer than one or two counts, but they exist frequently enough to warrant special attention in this chapter (with regards to alternation sticking). In order to provide the reader with a useful exercise, the melody of Figure 4.37 is augmented in Figure 4.38 and the pedal tone is decorated in each direction accordingly.



the A pedal is the anchor, which is played by mallet 4. Mallet 3 then alternates between the melody below and the alternation to G. Mallet 3 may be said to follow a prescribed sequence of intervals from the anchor, namely: 5th, 2nd, 6th, 2nd, etc. The "anchor" note provides a tangible focal point to, and from which mallet 3 can change intervals. The player needs only to look at the right hand during the melodic notes. (An experienced player will be able to bring mallet 4 to the anchor's neighbor tone without actually looking at the anchor and the ear can confirm the anchor's location twice per beat.)



**Figure 4.38, A and B: Two possible training variations of Figure 4.37.**

Figure 4.38.B makes the process slightly more difficult by using the exterior neighboring tone, but the same technique will apply to this passage. The anchor remains assigned to the repeating A (played by mallet 4) and mallet 3 continues to alternate between the melody and the decorative neighbor tone, but now the sequence of intervals followed by mallet 3 must include notes that cross over the anchor. When the concept of negative intervals is applied to this passage, the prescribed sequence of intervals for mallet 3 from the anchor is: 5th, -2nd, 6th, -2nd, etc. The fact that this particular neighboring tone is a black bar neighbor to a white bar pedal tone makes the process slightly less difficult (if mallet 4 is placed slightly above the center of the A bar, then mallet 3 may use its extended length to easily reach to the near end of the Bb bar).

The sequence of A, Bb, A, performed respectively by mallets 4, 3, 4, should be isolated and practiced until it becomes comfortable. The exercise may be transposed to A minor or E minor to practice the passage with a white bar neighboring tone.

Most of the exercises of this chapter have dealt with only one hand at a time, or two hands in parallel motion. Obviously, in practical situations, this is not always the case—and only rarely is it the case in the music of Bach.

It is interesting to note that due to the mirror-image quality of human hands, contrary motion in music uses parallel hand techniques; and conversely, parallel motion in music uses contrary hand techniques. For example, if both hands are playing a C Major scale in parallel octaves, any given note is played using different muscles in each hand. In the case of the initial C, the left hand must use the smallest two fingers, while the right hand uses the index finger and thumb. The muscles are then reversed when the opposite mallet in each hand plays the D. In contrary (musical) motion, the hands may both use the same muscles to play each simultaneous note. For instance, if the left hand plays C, D, E, F, G and the right hand plays G, F, E, D, C, both hands may start with the outside mallet played by the two smallest fingers (and a mirrored wrist rotation), then proceed with the inner mallet on their respective second notes, and so on.

There are numerous ways to practice the skills of counterpoint—and sight-reading Bach's music is one of the best. The *Sinfonie*, the two books of the *Well-Tempered Clavier*, and especially the inventions provide a wealth of reading material in Bach's contrapuntal style. Slowing the tempo and/or isolating the hands in the beginning stages of reading are useful tools to make the initial experience less painful, but eventually the application of alternation sticking and the positional techniques of this paper will likely provide a reader with much greater stability in independent contrapuntal lines.

The exercise shown in Figure 4.39 provides a simple application of alternation sticking applied to two independent lines. This exercise may be transposed into all keys to practice alternation sticking as it applies to all diatonic scale shapes.



Figure 4.39: *London Bridge* as an alternation-sticking exercise.



Figure 4.40: Measures 1 and 2 of exercise No. 10. from *Hanon: The Virtuoso Pianist* with alternation stickings applied.



Figure 4.41: Measures 1 and 2 of exercise “No. 10.” from *Hanon: The Virtuoso Pianist* with alternation stickings applied and the right-hand line inverted.

The piano method book entitled *Hanon: The Virtuoso Pianist*<sup>15</sup> may be used in a number of creative ways to train the marimbist’s hands for counterpoint. The exercises (especially of Part I) may be played as written with alternation sticking (selective double strokes applied as necessary). One line may be inverted from each exercise to produce contrary motion. Through

<sup>15</sup> Hanon, C. L., *The Virtuoso Pianist*, trans. Theodore Baker, (New York: G. Schirmer, 1900).

transposition, the application of non-traditional scales, and improvisation, the use of Hanon's exercises is limited only by the player's imagination. Figure 4.40 illustrates the first two measures of Hanon's exercise No. 10 with alternation stickings in place of Hanon's finger numbers. Figure 4.41 illustrates the same excerpt with the right hand inverted—generating contrary motion between the hands.

## 4.7 Original Etudes

The first etude of this chapter is entitled Precedential Behavior and it may be found beginning with Figure 4.42. Precedential Behavior is based upon Bach-like decorations of a pedal tone (compare measure 1 of the etude with the exercise of Figure 4.38, which illustrates a technique that may be found in the Bach pieces of Chapter 5). The fourth count of measures 4 and 41 and the B section of the piece (measures 11-15) require negative intervals. The thirty-second-note passage at the end of the piece is very similar to that used in the excerpt from Andrew Thomas' Merlin shown in Figure 4.53 (with discussion preceding the figure).

The second, and final, original etude of this chapter is entitled *Do Bats Eat Cats?* and may be found beginning with

Figure 4.46. *Do Bats Eat Cats?* is specifically composed to emphasize the techniques of contrary motion and independence from one static hand. The author strongly recommends that the player adhere to the stickings indicated—the initial difficulties will soon disappear and the player will gain experience in alternation sticking and its resultant positional movement technique.

Measure 2 (and subsequent similar measures) of *Do Bats Eat Cats?* should be played with the mallets in the position shown in Figure 4.45.



## Thomas Zirkle

Thomas Zirkle

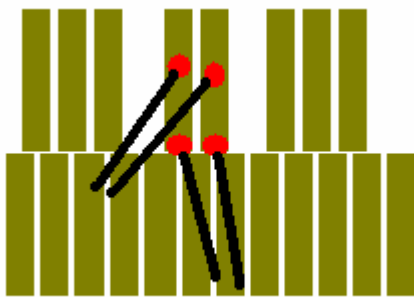
**Figure 4.42. Page 1 of an original etude for alternation sticking entitled Precedential Behavior.**



**Figure 4.44: Page 3 of an original etude for alternation sticking entitled Precedential Behavior.**

#### 4.8 Application of Alternation Sticking to Existing Marimba Literature

This concluding section of Chapter 4 will enumerate a procedure for assigning alternation sticking to linear passages of any style. Specific excerpts from Peters' *Yellow After the Rain* (a diatonic melody) and Andrew Thomas' *Merlin* (a passage which builds a line from first one octatonic collection, then another) will be analyzed using the sticking and positional principles outlined in this chapter.



**Figure 4.45:** Hand position for measure 2 (and subsequent similar measures) of *Do Bats Eat Cats?*.

Many of the techniques to be suggested for assigning alternation-sticking patterns are the same as those used in any sticking rationale. This discussion will combine standard practices with those of alternation sticking. There are three simple steps to be recommended below: Step One—Isolate the section of music where stickings are needed; Step Two—Consider any potential conflicts between the hands in the passage selected in the previous step; Step Three—Bearing in mind the considerations of Step Two, experiment with the assignment of specific stickings to both hands. A more detailed description of these steps may be found in the following paragraphs. The reader may wish to examine the two concrete examples (Figure 4.52 and Figure 4.53) before, and/or during, the reading of the three individual steps.

# Do Bats Eat Cats?

An Alternation-Sticking Etude

Thomas Zirkle

The musical score is written for piano and consists of four systems of music. Each system has a treble and bass staff. The first system starts in 2/4 time, changes to 3/4, and then back to 2/4. The second system starts in 2/4, changes to 3/4, and then back to 2/4. The third system starts in 3/4, changes to 9/16, 7/16, 9/16, and 7/16. The fourth system starts in 7/16, changes to 6/16, 7/16, and 3/4. The score includes various dynamics (f, mf) and fingering numbers (1-4) above the notes.

Figure 4.46: An original etude for alternation sticking entitled *Do Bats Eat Cats?* (page 1).

The musical score is divided into five systems, each with a treble and bass staff. The key signature is one sharp (F#). The systems are numbered 14, 17, 20, 23, and 26. The music features complex rhythms and alternating sticking patterns indicated by numbers 1 and 2 above the notes. The dynamics include p (piano), mp (mezzo-piano), and p (piano).

**System 1 (Measures 14-16):** Treble staff starts with a piano (p) dynamic. The bass staff has a mezzo-piano (mp) dynamic. The time signature changes from 3/4 to 2/4 to 6/16 to 2/4.

**System 2 (Measures 17-19):** Treble staff continues the melody. The bass staff continues the accompaniment. The time signature changes from 2/4 to 6/16 to 6/16.

**System 3 (Measures 20-22):** Treble staff continues the melody. The bass staff continues the accompaniment. The time signature changes from 6/16 to 3/4 to 2/4.

**System 4 (Measures 23-25):** Treble staff starts with a mezzo-piano (mp) dynamic. The bass staff has a piano (p) dynamic. The time signature changes from 2/4 to 2/4 to common time (C).

**System 5 (Measures 26-28):** Treble staff continues the melody. The bass staff continues the accompaniment. The time signature changes from common time (C) to 3/4 to 3/4.

Figure 4.47: An original etude for alternation sticking entitled *Do Bats Eat Cats?* (page 2).



**Figure 4.48:** An original etude for alternation sticking entitled *Do Bats Eat Cats?* (page 3).

#### 4.8.1 Step One: Identify Small Sections of Music in Each Hand

As an entire work cannot be analyzed at one time, the player must first choose groups of notes that work together at or below the level of the phrase. The specific grouping of notes is an heuristic task that will be different for each passage analyzed (and will vary from person to person), but some general guidelines may assist the player. A quick visual scan of the score will

often give some assistance through such means as the location of rhythmic cadences, repetition (especially in minimalistic works), rests (where the hand may easily be moved to a new position), and general contours of line (see Figure 4.53 in the upcoming examination of a passage from *Merlin*). Generally speaking, these small sections are easy to assign as most music is composed in such a way that dividing points may be found nearly everywhere; the challenge is in choosing the point that will work the best for the sticking logistics. If there is no obvious sectioning of the work, then the player may simply invent the subdivisions subjectively, utilizing any criteria appropriate to the passage.

#### **4.8.2 Step Two: Search for Potential Complications in the Coordination of the Two Hands**

Once a small section of music is selected, Step Two examines the interaction of the two hands, looking for specific problems that might occur in Step Three (when the actual stickings are assigned). Step Two may usually be addressed (and dismissed) very quickly as the hands nearly always cooperate, either through integrated two-hand lines, or through generally homophonic textures. Complications that might be noted in Step Two include: very wide intervals between the hands (with, for an extreme example, a left-angled position in the left hand and a right-angled position in the right hand); one-handed rolls (which might affect the potential tessitura); notes that appear simultaneously in both hands; and awkward rhythmic relationships between the hands. These are just a few of the difficulties that might arise— the marimbist must be creative, for each passage has its own unique challenges.

In the small section from *Merlin* (seen in Figure 4.53) the hands are integrated by parallel octaves into a single line. If a parallel sticking (between the hands) is chosen, all necessary body movements will organically assist both hands. The alternation sticking chosen below is indeed a

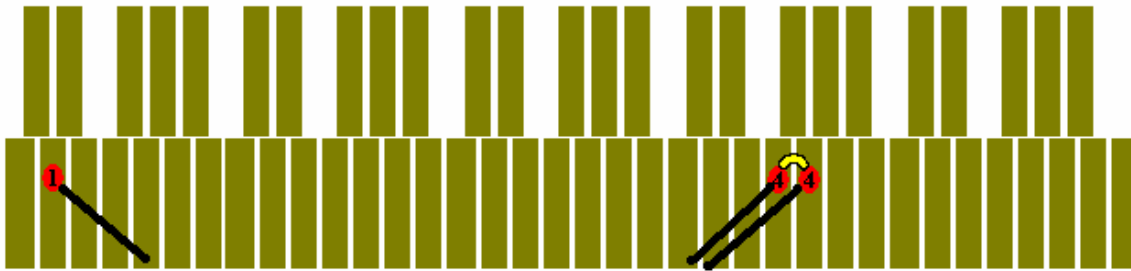


parallel sticking (Mallets 1 and 3 are aligned together, as are mallets 2 and 4 throughout the passage.)

In the small section from *Yellow After the Rain* of Figure 4.52, the texture is homophonic with the melody in one hand and the chords (double stops) in the other. This passage is slightly odd in that the hands are inverted from the normal homophonic texture—but this does not change the technical approach. In homophonic textures, the most common complications for sticking choice result from tessitura and elbow angles. The tessitura of this passage is severely limited with only a ninth between the passage's highest and lowest notes (and even those notes are not played simultaneously). The elbow angles could potentially be a problem in Step Three, although it is not to be expected without a wider range between the hands. The shared C's (between the hands) in measures 18 and 20 is a difficulty that will need to be addressed in Step Three. Although this is a rare problem, it can also be seen in two different passages of Bach's *Two-Part Invention in F Major* (see Annotation ii and Annotation v of Chapter 5).

Truly independent contrapuntal passages, such as those of Bach's inventions are the most problematic in Step Two. The connection between Annotation xii and Annotation xiii of the F Major invention in Chapter 5 gives an example of where the tessitura must be considered in preparation for Step Three. If played in isolation, the right hand could use absolute alternation on all of its notes between measures 22 and 28, but the body position necessary to play the low D in the left hand at the beginning of measure 24 must be taken into consideration (see Figure 4.49). Mallets 1 and 4 may easily reach very wide intervals, but the inclusion of mallets 2 and 3 (and alternation sticking) at these intervals is uncomfortable (and risky in terms of accuracy). Consequently Step Three will be required to use repeating sticks at three locations between

measure 24 and 25 in the right hand. (The first doubled stick concludes with the first note of the right hand in measure 24, as a repetition of measure 23's last note.)



**Figure 4.49: Hand position at the beginning of m. 24 of Bach's *Two-part Invention in F Major*.**

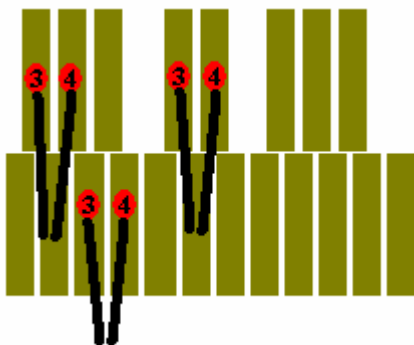
Rhythmic interaction between the hands may also be a complication that is discovered in Step Two. Usually, difficult rhythmic interaction must be overcome by slow practice, but occasionally sticking choices may be found in Step Three to alleviate some of the awkwardness and lead to a more stable performance.

During the application of Step Three below, unforeseen (in Step Two) complications might still arise. These, previously unknown, difficulties must be solved during the process of Step Three, but each new problem represents a learning opportunity for the player. As the marimbist gains experience through each new complication, it may be added to the player's repertoire of potential difficulties to be avoided during future applications of Step Two.

### 4.8.3 Step Three: Application of Alternation Sticking

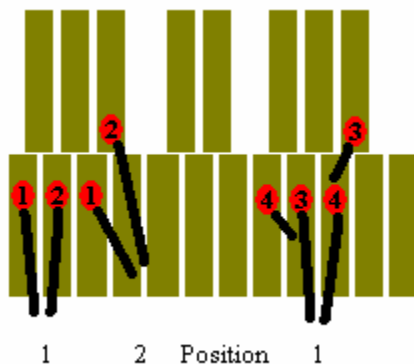
In Step Three, the actual stickings are assigned to the selected passage. In the use of alternation sticking, simple alternation between the mallets of each hand will be a solid starting point. This starting point can begin with either mallet, but certain scale shapes favor particular pairings. For instance, when playing any E major/F# dorian-shaped passage, the note pairings are less problematic if (in the right hand) mallet 3 is used for ascending passages on the F#, A

and C#. This consideration might suggest a starting point of the positions shown in Figure 4.50, unless other factors such as turning points in the line, awkward leaps, inconveniently repeated notes or interaction with the left hand were found to interfere. Ideally, any apropos complications will have been discovered during Step Two. It is important to note that the pairings of Figure 4.50 do not extend (through strict alternation) beyond one octave. If, for instance, this F# dorian scale were to continue into the next octave, mallet 3 would be on the E and mallet 4 would be on the F#, reversing the sticking (from the first octave) and shifting the positions out of the ideal pairings of Figure 4.50. Although these newly created shifted positions are not ideal, a player that has spent adequate time with exercises such as that found in Figure 4.7 (in all twelve major and dorian modes) would have little trouble with the non-ideal pairings. For the starting point of Step Three, however, the player should choose what seems to be the best stickings and deal with any problems as they might occur later in the passage. If an extraordinary number of problems occur, the player should consider going back to an earlier point and shifting the pairings by means of a repeated mallet (preferably over a long, slower note). The sticking that leads to the fewest exceptions to the alternation rule is probably the most graceful choice.



**Figure 4.50: Ideal note pairings when playing a linear passage in the shape of an E major scale.**

There are several other factors that might assist the player in the selection of an initial sticking. When possible, negative intervals should be avoided at turning points in the melody. If, for instance, a melody were to contain, in any key, the notes: Sol, La, Ti, Do, Ti, La, Sol, La, Ti, Do,<sup>16</sup> simple alternation from the left-most mallet in the hand would result in an undulation between two simple positions. (See the left hand part in Figure 4.51 for an illustration in the key of Bb.) If the same passage were started with the right-most mallet of the hand (as in the right hand of Figure 4.51), the result is a single hand position with a negative interval on the bottom and the top—which effectively forces the anchor to continually shift between La and Ti. The right hand position creates a single flat position while the left hand’s two positions are in flat and right-angled orientations. Assuming that this passage is for the right hand, a sticking like the left hand passage of Figure 4.51 (but with mallet 3 and mallet 4) is probably the best choice.



**Figure 4.51: Sol, La, Ti, Do in the key of Bb—showing a wise position selection in the left hand and an unwise one in the right.**

Complications for this fictional passage could have arisen during Step Two that would argue against a 3434343434 sticking could include a very wide interval between the hands. If a wide interval between the hands exists, reaching even further to the right to play a right-angled

<sup>16</sup> Movable “Do” solfeggio will be used throughout this study.

pair on the A and Bb could be impossible. In situations of this nature, a less-than-optimal sticking must be selected.

The image displays a musical score for measures 16 through 23 of the piece 'Yellow After the Rain' by Peters. The score is written for piano, with a grand staff (treble and bass clefs). Above the staff, ratios are indicated for each measure: 4/3, 4/3, 4/3, 4/3, 4/3, 4/x, 4/3, 4/3, 4/3, 4/3, 4/3, 4/3. Below the staff, stickings are indicated for each measure: 1 2 1 2 1 1, 2 1 2 1 2, 1 2 1 2 1 2 1 1, 2 1 2 1 2, 1 2 1 x 1 2 1 2, 1 2 1 2 1, 2 1 2 1 2, 1 2 1 2 1. The score includes various musical notations such as notes, rests, and accidentals.

**Figure 4.52: Application of Step Three to Peters' *Yellow After the Rain* measures 16-23.**

In the final figures of this chapter, alternation stickings have been applied to the two very different passages that were discussed in Step Two above. The left hand part of Figure 4.52 uses negative intervals in both mallets 1 and 2 (measures 16, 17, 19, 22, and 23), sliding anchors (measures 16 and 18), a springing position (count three of measure 20), and strict alternation from the springing position to the end of the passage. The simultaneous unisons of measures 18 and 20 use two different solutions to the problem: measure 18 leaves the C in the left hand line; and measure 20 places the C in the right hand—allowing the left hand an extra moment to prepare for the springing position on count three.

The stickings of the *Merlin* excerpt are nearly all alternation stickings. The perfectly parallel (octave) lines divide easily into simple positions, with sliding anchor positions used on the three-note groupings. The sliding anchors may easily be found by scanning the stickings for the occasional repeated mallet. Figure 4.53 depicts the note pairings—each three-note grouping

(excepting the high and low turning points of the line) uses one of these sliding anchor positions.

The final ascending line (beginning on the tenth sixteenth note of measure 203) uses strict alternation, within each hand, and simple positions up to the dotted eighth rest of measure 205.

If there were any sticking options necessary for the final three sixteenth notes of the passage, tessitura would be of paramount importance, but the quadruple stops allow no options for a four-mallet player.

The musical score is presented in three systems, each with a grand staff (treble and bass clefs) and a 6/8 time signature. The measures are numbered 201, 203, and 205 at the beginning of each system. Fingerings (1-4) and stickings (3-4) are indicated above the notes. The passage is highly technical, featuring many sixteenth notes and quadruple stops.

**Measure 201:** Treble clef starts with a quarter rest, then a series of sixteenth notes. Bass clef starts with a quarter rest, then a series of sixteenth notes. Fingerings and stickings are provided for each note.

**Measure 203:** Treble clef starts with a quarter rest, then a series of sixteenth notes. Bass clef starts with a quarter rest, then a series of sixteenth notes. Fingerings and stickings are provided for each note.

**Measure 205:** Treble clef starts with a quarter rest, then a series of sixteenth notes. Bass clef starts with a quarter rest, then a series of sixteenth notes. Fingerings and stickings are provided for each note.

**Figure 4.53:** Application of Step Three to Andrew Thomas' *Merlin* measures 201-205.

201 3 4 3 4 4 3 4 3 4 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3

201 1 2 1 2 2 1 2 1 2 2 1 2 2 1 2 1 2 1 2 2 1

203 4 3 3 4 3 4 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3

203 10 11 12 13 14 15 16 17 18 19 20 2 1 1 2 1 2 2 1 2 1 2 1 2 1 2 1 2 1 2 1

205 21 22 23 24 4 3 4 3 4 3 3/4 3/4 3/4 1/2 1/2 1/2

**Figure 4.54: Positional analysis of Figure 4.53.**

## **Chapter 5: Bach Transcriptions with Annotations**

The goal of this chapter is to illustrate the process of finding solutions to performance difficulties of a technical nature. This author's specific plans change from time to time on each passage (including those of these annotations), but the important concept to see in the annotations of this chapter is that the planning of visual and kinesthetic logistics (combined with the positional techniques of this paper) offer a system by which players may address difficult technical passages. If possible, this chapter should be read with a separate copy of the annotation map at hand. Annotations will occasionally refer to notes slightly before or slightly after those visible on the annotation's figure.

It is highly recommended that the player go through the annotations in the sequence in which they are presented. This author made the mistake, many years ago, of beginning with the considerably more technically demanding prelude and fugue—spending several years, with limited success, trying to apply a vague, underdeveloped version of the alternation sticking outlined in this study to these very difficult pieces. The inventions are much more accessible and provide a springboard for applying and understanding the concepts of alternation sticking. This is not to say that the inventions are not difficult—they are, but they are not as densely packed with technical challenges as the prelude and fugue transcriptions. The exercises of Chapter 4 will also provide the reader with a substantial "short cut" compared to the time spent by this author in learning the techniques, then backward-engineering exercises to suit them.

While there are certainly technical issues present in all of the works of this chapter, the three inventions will contain annotations that are more specific in technical descriptions. The Prelude and Fugue annotations tend to be inclined toward verbal descriptions and will include information on how alternation sticking was used in generating the transcriptions. New technical



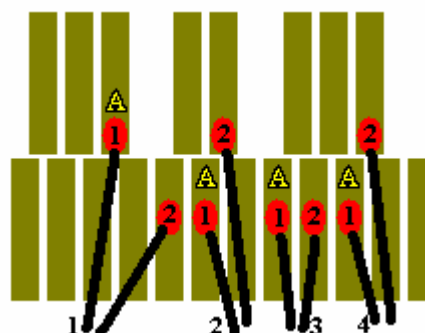
concepts found in the Prelude and Fugue will certainly be described in detail, but concepts such as transferred anchors, chained anchors, sliding anchors, etc. will be taken as understood.

**Table 5.1: Legend for subsequent annotations.**



Numbers on red mallet heads indicate stick number.

Numbers at the convergence of sticks (below the keyboard) indicate position number (Position 2 of this left-handed Bb scale plays the D and the Eb.) Note that positions may contain repeating mallets (i.e. a single position might contain an anchor on mallet 4 and several different notes on mallet 3).



Golden A's denote anchor notes for a hand position. In the Bb scale diagram shown, the anchors are placed for the ascending scale only. Anchor notes, especially in strictly scalar melodies like this one, will often be omitted. Anchors may also be found on musical notation.



Anchors with barred yellow connections represent transferred anchors. These transferred anchors may be either chained or sliding.



Green eyes will be inserted over musical notation to indicate a note (or notes) to be visually identified by the player.

Purple ears will be inserted over musical notation to indicate a note (or notes) to be aurally identified. These illustrations will only be included in the first few annotations.



Blue boxes and numbers refer to hand positions.

The following pieces by J. S. Bach will be transcribed and annotated in Chapter 5:

Two-Part Invention in F Major

Two-Part Invention in E Major

Two-Part Invention in Bb Major

C Minor Prelude (from *The Well-Tempered Clavier* Book II)

C Minor Fugue (from *The Well-Tempered Clavier* Book II)

Each transcription will first be shown in its entirety with a numbered annotation map drawn in red over the musical notation. Following the annotation map of each piece will be its

respectively-numbered annotations. Each piece may be found in rehearsal format (without the red annotation mapping) in Appendix II.

### 5.1 J. S. Bach's *Two Part Invention in F Major*

**Two Part Invention in F Major**  
J. S. Bach/ trans. Thomas Zirkle  
Transcribed for 5-Octave Marimba

The musical score is presented in four systems, each with a treble and bass staff. Red boxes highlight specific sections of the music, labeled with Roman numerals i through vii. Fingerings are indicated by numbers 1-4 above or below notes. The first system has a measure with a red box labeled 'i' and a measure with a red box labeled 'ii'. The second system has a measure with a red box labeled 'iii'. The third system has a measure with a red box labeled 'iii cont.' and a measure with a red box labeled 'iv'. The fourth system has a measure with a red box labeled 'v', a measure with a red box labeled 'vi', and a measure with a red box labeled 'vii'.

**Figure 5.1:** Page 1 of the map for subsequent annotations of Bach's *Two Part Invention in F Major*.





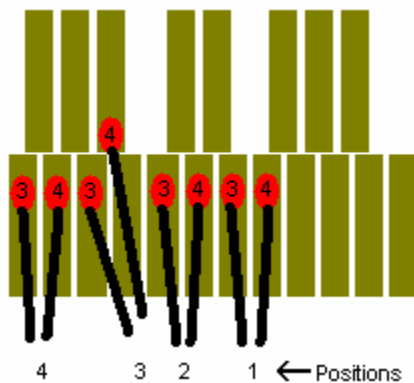
**Figure 5.3:** Page 3 of the map for subsequent annotations of Bach's *Two Part Invention in F Major*.



**Figure 5.4:** Bach's *Two Part Invention in F Major*; Annotation i.

This first sixteenth-note passage of the piece works very well with alternation sticking. The first two notes are played as two simple eighth notes, then, one sixteenth later, the hands must be in position 2 (see Figure 5.5). As mallet 3 plays the E, mallet 4 lifts in preparation for its

next note. Mallet 4 must now play the D just as the hand shifts into position 2. Once in position 2, the hands are prepared for the next four notes—all of which are directly under the mallets without modification to the hand position. The fact that four sixteenth notes are played in positions 2 and 3 (instead of two sixteenths) slows the position changes to once per beat (beginning on the fourth sixteenth). The third position is a "hard" angle to the right, but as this is coming from, and going to, flat positions, it presents little problem to the player.



**Figure 5.5: Hand positions for Annotation i.**



**Figure 5.6: Bach's *Two Part Invention in F Major*; Annotation ii.**

The doubled unison is taken directly from the several keyboard versions examined in preparation for this transcription. The right hand is indicated to play the F with mallet 3 and the

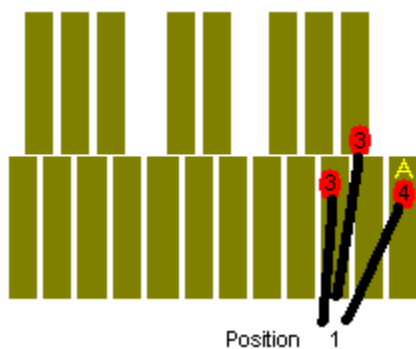
left hand is given simply a hyphen—indicating that it should not strike the F. The following stroke in the left is indicated to be played by mallet 1 (as if mallet 2 had indeed played the F). The line then continues with exactly the same note pairings as Annotation i above. While playing the F with both hands would physically be preferable to interrupting the line in either hand (and would be possible on a harpsichord), both hands striking together on a marimba bar would noticeably change the tone, therefore the F must be omitted in one hand.

**Figure 5.7: Bach's *Two Part Invention in F Major*; Annotation iii.**

Unlike Annotation i, most of Annotation iii uses complex (shifting) hand positions. These complex hand positions necessitate the inclusion of an anchor in annotation discussions.

In the case of the first measure of Annotation iii, the upper C (of measure 4) serves as the anchor, allowing the two notes of mallet 3 to act with the C as a single hand position. Mallet 3 alternates between the A and the Bb, while mallet 4 remains rooted on the C (See Figure 5.8). Similar positions are used in subsequent measures of the example in both hands—always with the anchor on the upper note of the figure (playing the second and fourth sixteenth note of each count). Figure 5.9 shows the possible mental activity of a player during this passage. Tracing

the eye's movements throughout the passage begins with the right hand in the treble register. The player looks at the bars indicated above the treble staff and sets the right hand to the first position (described above), then shifts the eye to find middle C for the left hand. Throughout the measure this player actively uses the ear (along with the kinesthetic sense of the first right-hand anchor) to maintain the position of the right hand.



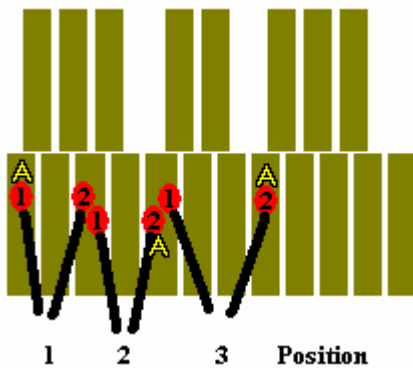
**Figure 5.8: Bach's *Two Part Invention in F Major*; Annotation iii hand positions.**



**Figure 5.9: Bach's *Two Part Invention in F Major*; Annotation iii. Visual and Aural logistics.**

The first left-hand position is gained from the final position of the previous measure. On count 2, the left hand shifts into its second position (the C anchor with the A a third below). During count 2, the eyes find the F above middle C and mentally prepare the left hand to shift to the F for the third left-hand position (F anchor with the C a fourth below). During this third count—the left-hand position has been set, and the right-hand continues to be monitored by the

ear—the eyes look ahead to find the positions for both hands for count one of the next measure (measure 5 of the piece). The eyes have plenty of time to prepare for these positions, by finding both of the anchors and the notes a third below (which will precede the anchors as the first notes played in measure 5).



**Figure 5.10:** The left hand positions for measure 4 (shown in Annotation iii). N.b. Playing positions on the bars are for the sake of illustration—mallet 2 of position 1 and mallet 1 of position 2 would, in actuality, play in the same position near the center of the bar.

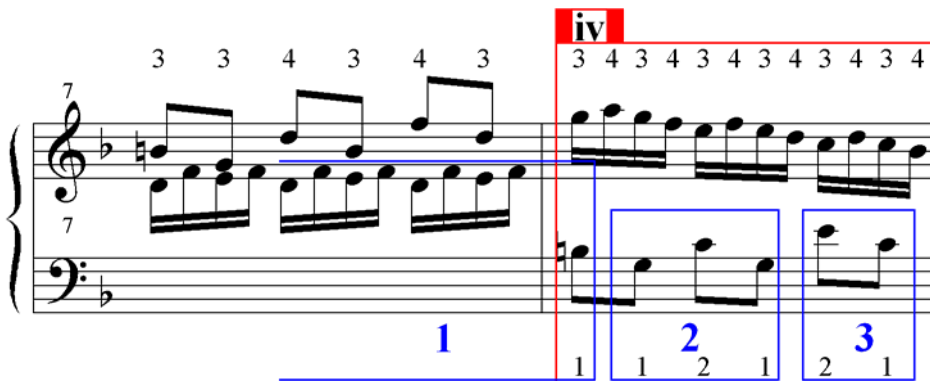


**Figure 5.11:** Bach's *Two Part Invention in F Major*; Annotation iv.

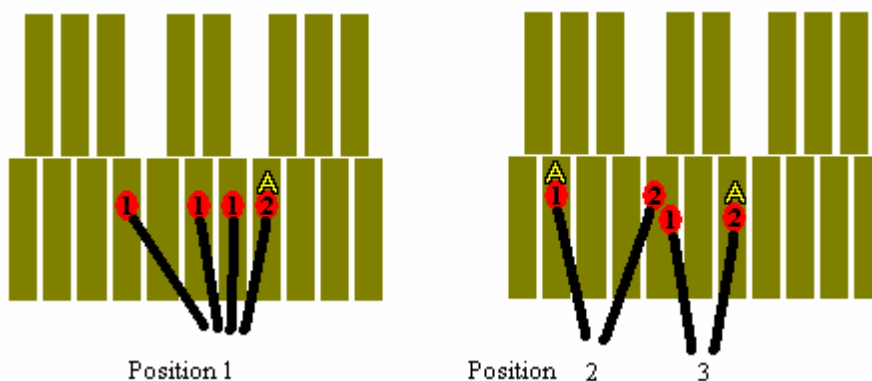
The right hand of Annotation iv is a development of the second measure of the exposition and, as such, is played in a similar manner—changing positions on the fourth sixteenth note of each count. The first right-hand position is a new position and represents a mental break from



the previous measure, but the B in the left hand should be conceived as a fifth (diminished) below the F anchor of the previous measure. After playing its B, mallet 1 slides a third downward to set the G anchor for position 2. The logistics of the transition from position 2 to position 3 allow an interesting blur between the two positions. After its C, mallet 2 is finished with position 2 and may begin reaching for the anchoring E of position 3 while mallet 1 completes position 2. In this thought-provoking (and surprisingly common) situation, the anchor for position 3 may actually be set before position 2 is completed—with mallet 1 shifting into place over the C well before it is necessary to play the C.



**Figure 5.12: Bach's *Two Part Invention in F Major*; Annotation iv. The three hand positions of the left hand.**

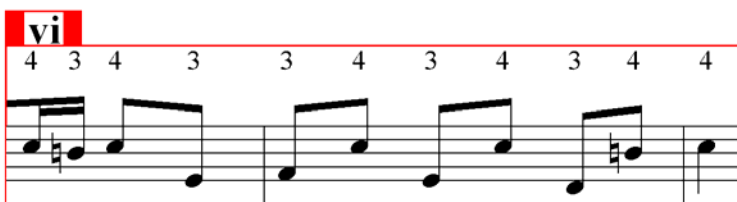


**Figure 5.13: Bach's *Two Part Invention in F Major*; Annotation iv. Representation of hand positions from Figure 5.12.**

In Annotation v (Figure 5.14) reaching across with mallet 1 to play the C in the left hand may, at first glance, seem an awkward choice, but there are some compelling reasons to support it. Starting the passage (on the C) with mallet 2 and continuing with alternation sticking quickly shows itself as a poor choice by necessitating either several uncomfortable negative intervals or a repeated mallet (possibly mallet 1 repeating for the B and A). While a repeating mallet in itself is not a particularly bad option, in this case, the repetition of a mallet in the left hand awkwardly breaks the parallelism between the hands, while the sticking indicated in Annotation v mirrors the right hand.



**Figure 5.14: Bach's *Two Part Invention in F Major*; Annotation v.**

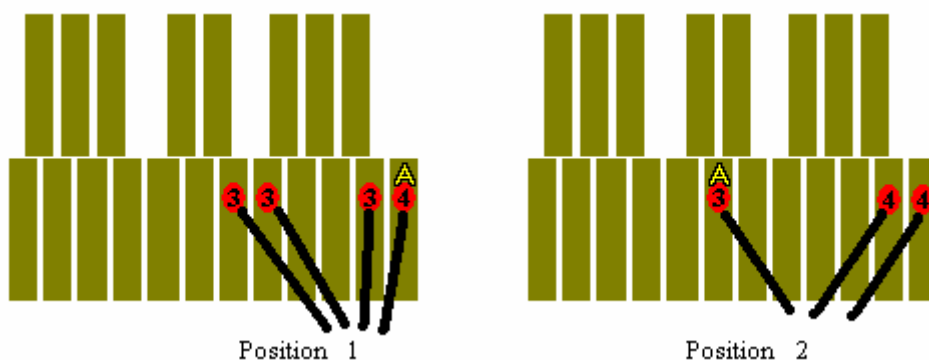


**Figure 5.15: Bach's *Two Part Invention in F Major*; Annotation vi.**

Position 1 of Annotation vi (Figure 5.15) is going to take some visual attention because of the wide leap between the B (the lower neighboring tone to the anchor) down to the E. In spite of the rapid motion in the left hand, the passage is not as difficult as it appears for two

reasons. First, from the B on the second sixteenth of the excerpt to the lower E in the following count are three full sixteenths of unoccupied time for mallet 3 to relocate. Second, the player can use these three sixteenths to move mallet 3 to a kinesthetic approximation of a sixth, then a quick (even peripheral) glance can verify its location over the subsequent D.

The initial placement of position 2 simply requires taking the final hand shape of position 1 (a sixth from E to C) and sliding it downward one step (to D and B). The final C occurs alone and can easily be verified by the eye. All that must happen in the left hand during the playing of this C is to set up for a dominant episode, which doesn't start for another full eighth note—giving plenty of time to check the left hand position.



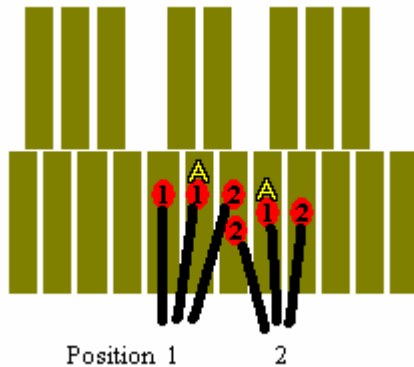
**Figure 5.16: Bach's *Two Part Invention in F Major*; Annotation vi. Hand positions for Annotation vi.**



**Figure 5.17: Bach's *Two Part Invention in F Major*; Annotation vii.**

The doubled stick in the first count is unavoidable as the several ways it might be avoided are more awkward than this use of a simple paradiddle. Beginning with mallet 2 would work nicely, except that the notes immediately before this passage contain a specific melodic shape

that has a precedential sticking associated with it (from the exposition). This forces the passage to begin with mallet 1.



**Figure 5.18: Bach's *Two Part Invention in F Major*; Annotation vii. Hand positions.**

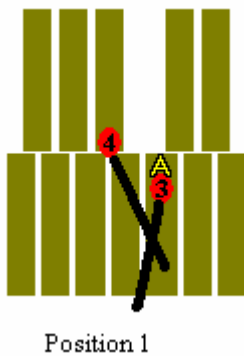
Simple alternation from mallet 1 throughout the passage is quickly seen to be more difficult (with an interesting, but awkward, two consecutive negative intervals' crossing a leap of a fifth). After ruling out these alternative stickings, the sticking notated in the transcription is, essentially, a strict alternation beginning with mallet 1, with the exception of a single paradiddle on the first count of measure 11. In count 2 of measure 11, mallet 2 must cross the anchor to a negative interval (negative second) for the E while holding the F as an anchor. The doubled mallet 1 (in the paradiddle) actually gives mallet 2 some extra time to get into place over the G. This left-hand line is only possible with nearly constant eye maintenance—fortunately the right hand is all but static at this point and the eye is free to watch the left hand.

The first two sixteenths of Annotation viii (Figure 5.19) are a continuation of the previous measure. The fact that the pattern does not continue, by way of the melody turning back to the C on the third sixteenth, creates a negative second interval on the Bb (with the C of mallet 3 functioning as an anchor). The striking location of the position 1 mallets is very important. The Bb must be struck on the very end of the bar and the C must be struck above the

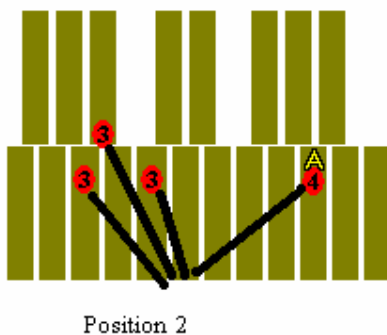
center of the bar. The hand can actively remember<sup>1</sup> (and return to) the position of mallet 3 on the C even when mallet 3 moves slightly out of position to allow the crossing of mallet 4.



**Figure 5.19: Bach's *Two Part Invention in F Major*; Annotation viii.**



**Figure 5.20: Bach's *Two Part Invention in F Major*; Annotation viii. Position 1.**



**Figure 5.21: Bach's *Two Part Invention in F Major*; Annotation viii. Position 2.**

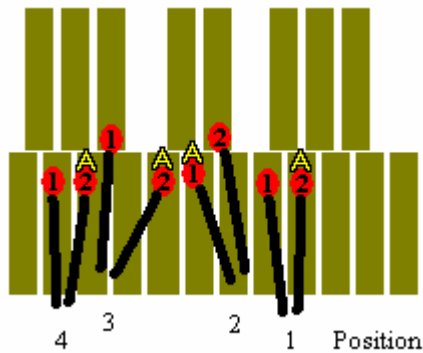
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<sup>1</sup> This is, technically speaking, personification of the hand. The memory described in this sentence actually takes place between the kinesthetic sense and what is often called "muscle memory."

On the fourth sixteenth note of Annotation viii, the anchor transfers to the A under mallet



This three measure passage is based on the interaction between the first and second measures of the exposition. (See measure 2 of the invention.) The left hand sixteenth notes in measures 16 and 18 will be the most technically challenging part of this invention for most players; therefore, these measures might need to set the tempo for the player to use from the beginning of the invention. While the transposition to G minor only adds one flat to the scale shape, the location of the second flat is particularly problematic as it forces a transition from a right-angled position (position 2) to a left-angled position (position 3). Fortunately, the hand positions transitions are paced to occur at four sixteenth note intervals—giving plenty of time to prepare for each shift. Position 2 begins on the fourth sixteenth of count one, then position 3 does not begin until the fourth sixteenth of count two. After the second sixteenth of count two, mallet 2 is finished in position 2 and can lift in preparation to become the anchor in position 3. While mallet 2 is lifting, the wrist should begin turning around the D anchor toward the left-angled position. (This turning occurs simultaneously with the playing of the D by mallet 1.)

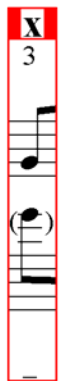


**Figure 5.23: Bach's *Two Part Invention in F Major*; Annotation ix. Hand positions.**

This passage necessitates careful body placement and graceful large-scale body movement in order to enable the wrists and elbows to support the hand positions illustrated in Figure 5.23 above. The fact that this awkward passage is repeated in three different octaves, in as many measures, makes the choice of the body's positions and transitions of vital importance.

This author has found it helpful to deliberately place the mallets of position 4 by ear while the eye follows the right hand. The key to this placement is to combine the ear with a strong mental picture of the Bb, A, G sequence of bars, then simultaneously place the mallets onto the mental and the physical keyboard (verifying the final two pitches with the ear). This technique is very effective in this passage and completely frees the eyes to prepare the right hand (two octaves above) for a repeat of this left-hand sixteenth note passage in the next measure.

In Annotation x (Figure 5.24), as in Annotation ii above, the left-hand note is not to be played. The G is written twice in order to clearly show the lines of both hands, but cannot be played by both hands without compromising the tone quality of the bar.



**Figure 5.24: Bach's *Two Part Invention in F Major*; Annotation x.**



**Figure 5.25: Bach's *Two Part Invention in F Major*; Annotation xi.**

The passage of Annotation xi is virtually identical to the right-hand passage in Annotation viii above. The first two notes form a negative interval that connects directly with the end of the preceding measure. On the fourth sixteenth of the first count, the anchor transfers to mallet 2. While the final E of mallet 2 in the first measure is playing, mallet 1 is preparing to be a firm anchor on F for the second measure. The second measure of the annotation is the same as the first measure, but played one step lower—as there are no accidentals in either measure, the second measure retains exactly the same shape and technique.

Although Annotation viii (Figure 5.26) is the most physically challenging passage of the invention, this three-measure sequential passage presents the most challenging passage for independence between the hands. Unlike the rest of the invention, this passage possesses two lines that need eye contact simultaneously; therefore, the player must carefully coordinate (and



rehearse) the actions of not only the hands, but also the eyes and the ears. Figure 5.7 shows a plan for coordinating these three elements.



**Figure 5.26: Bach's *Two Part Invention in F Major*; Annotation xii.**



**Figure 5.27: Bach's *Two Part Invention in F Major*; Annotation xii. Visual and Aural logistics for Annotation xii.**

The right hand in this passage is not terribly different from some of the earlier passages in the invention.<sup>2</sup> The first anchor is on the G with mallet 3—mallet 4 plays a negative second and a third from the anchor. On the fourth sixteenth note, the right-hand anchor transfers to mallet 4 and remains on the Bb until the beginning of the next measure where it transfers back to mallet 3. The subsequent measures of Annotation xii repeat this pattern. After the transfer to mallet 4 the eye can move to the left hand where the hand positions are much more intricate. Measures

<sup>2</sup> See Position 1 of Annotation viii above.

22 and 23 also contain a visual checkpoint along the eye's move to the left hand in order to assist mallet 3 in finding its note for the beginning of the second beat. This checkpoint need not wait until the second count starts, as mallet 3 should be moving to the B (in measure 22) immediately following its F on the third sixteenth of the first count.

The left hand, although playing slower notes, contains considerably more intricately connected hand positions than does the right. In measure 21, mallet 2 must find its first anchor without the aid of the eye (which is occupied with the transfer of anchors in the right hand). In the subsequent two measures, this corresponding first anchor may be found by simply closing mallet 1 one step closer to the anchor. Sequential patterns must often be changed in their first iteration, as the material before the beginning of the first measure is not the same as the material before the beginning of each subsequent measure. As may be seen here, even though the interval content in all three measures is tonally identical, the first measure must be played differently because of its connection to the non-sequential previous measure. The second and third measures of the sequence are identical in both "eye and ear" logistics and stickings—with the exception of the last note of the left hand which must prepare for the following non-sequential measure. This passage is a wonderful example of the interaction between sticking selection, technique, and rehearsal acuity.

If isolated, the right-hand part for Annotation xiii (Figure 5.28) could use absolute alternation sticking by beginning with mallet 3 and continuing with an alternation to mallet 4—the line would flow much more gracefully and the inter-manual motion would be simplified by having all anchors on white bars. When the left hand is taken into consideration, however, the right hand no longer has the luxury of using the most graceful sticking. The interval between the mallets on the first note, and consequently the body's position to play these notes, necessitates

beginning with mallet 4 in the right hand (even though it is a repetition of the last mallet used in the previous measure).



**Figure 5.28: Bach's *Two Part Invention in F Major*; Annotation xiii.**

The left-hand part is absolutely straight-forward, with one hand position per measure. The left hand is only complicated by the wide leaps, but some of these leaps are easy to find, for instance the first leap of mallet 1 from D up a seventh to C may be found by simply pulling mallet 1 up to the anchor's adjacent bar. The narrow interval exercises in Chapter 4 were designed to train the hands to be adept at finding adjacent bars in just such a situation.

When playing the passage of Annotation xiv (seen in Figure 5.29), players with small hands (or players using a marimba with wide bars such as a Malletech) might consider moving the C of the final chord down into the bass clef. In this position the left hand plays a fifth with the root on the bottom and the right hand plays a sixth with the root on the top. This alternate voicing slightly blurs the resolution of the cadential 6-4 (at least when compared to Bach's original voicing), but, if necessary, this seems the best solution. Possible other solutions are a string instrument-like upward cascade of the final quadruple stop, or the slightly more risky option of quickly transferring mallet 2 into the right hand immediately before the last eighth note

of the penultimate measure, thereby playing the final chord with mallets 2, 3, and 4 in the right hand. When combined with a final cadential ritard, this final option is less dangerous than it first appears.



**Figure 5.29: Bach's *Two Part Invention in F Major*; Annotation xiv.**

## 5.2 J. S. Bach's *Two Part Invention in E Major*

The contrary motion displayed in Annotation 1 (Figure 5.33) is found in similar passages throughout the invention. Alternation sticking is particularly well-suited to this type of linear passage: the left hand simply plays an ascending E major scale and the right hand plays the same scale (descending) with a chromatic passing tone between Ti and La. The pairs of notes fall more comfortably into the right hand, so the player should focus visual attention onto the left hand. Figure 5.34 illustrates the right-hand pairs—note the LLFF orientation of the pairs (as read from right to left following the descending line). The LLFF orientation sequence is fairly stable (it doesn't contain any rapid elbow movements), while the left-hand passage requires a significant elbow shift from a right-angled pair (E and F#) to a left-angled pair (G# and A).

# Two Part Invention in E Major

J. S. Bach/ trans. Zirkle

Transcribed for 5-Octave Marimba

The musical score is presented in a system of four systems, each containing a treble and bass staff. The key signature is E major (three sharps). The time signature is 3/8. The score is divided into eight measures, each labeled with a Roman numeral (i. to viii.) in a red box. The notation includes notes, rests, and fingerings. Measure numbers 6, 11, 16, and 21 are indicated at the start of their respective systems. Red boxes highlight specific musical phrases in each measure.

Figure 5.30: Page 1 of the map for subsequent annotations of Bach's *Two Part Invention in E Major*.

**Figure 5.31: Page 2 of the map for subsequent annotations of Bach's *Two Part Invention in E Major*.**



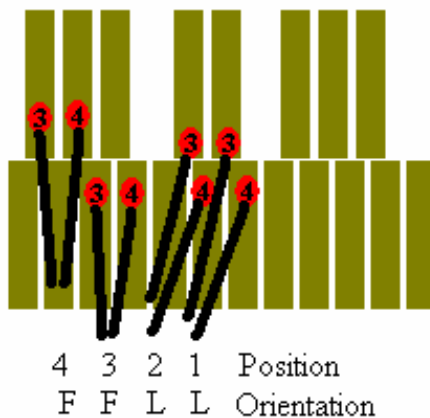
**Figure 5.32: Page 3 of the map for subsequent annotations of Bach's *Two Part Invention in E Major*.**



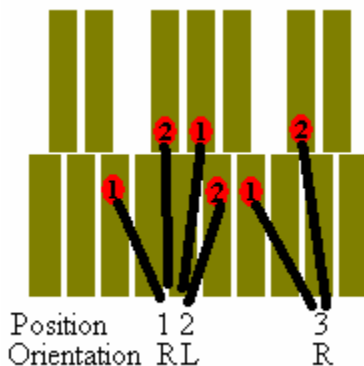
**Figure 5.33: Bach's *Two Part Invention in E Major*; Annotation i.**

The elbow shift could be avoided by beginning the passage with mallet 2, which necessitates a doubled stick sometime before the E in measure 3, or by beginning with a doubled mallet 1 (also requiring a second doubling at or before measure 3). This author has found that

after practicing such exercises as found in Figure 4.7 (in 12 keys—major and dorian) the hands are prepared for all sequences of diatonic pairings. Scalar elbow shifts are less risky than multiple destabilizing elements such as doubled sticks and beginning with a springing position. If the right-hand part were less idiomatic, one or more of these minor destabilizing elements (in a judiciously chosen spot) might need to be considered.



**Figure 5.34: Bach's *Two Part Invention in E Major*; Annotation i. Right Hand Positions.**

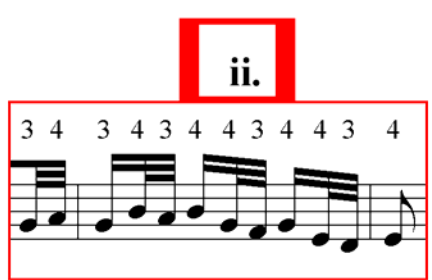


**Figure 5.35: Bach's *Two Part Invention in E Major*; Annotation i. Left Hand Positions.**

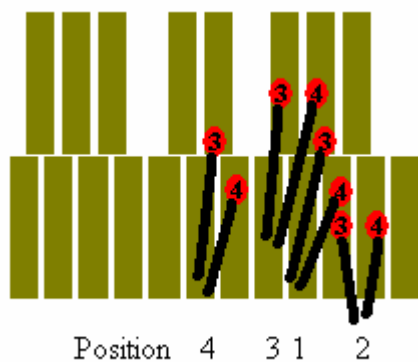
The thirty-second notes found in Annotation ii (Figure 5.36) are the most challenging rhythmic figures in the entire invention. The thirty-second note figures are fast and they are played exclusively in the narrowest of intervals. The awkwardness of the speed and narrow intervals is mitigated by the fact that, other than two brief instances in measures 46 and 50, the



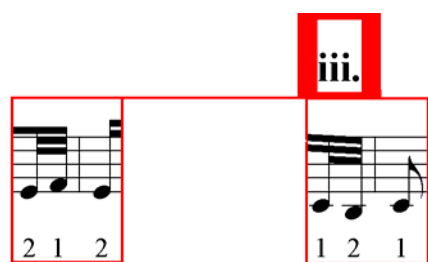
opposite hand is playing very stable positions during each presentation of this motive. The conception of discreet positions for each group of thirty-second notes will further aid the player in the mastery of these passages (see Figure 5.37).



**Figure 5.36:** Bach's *Two Part Invention in E Major*; Annotation ii.



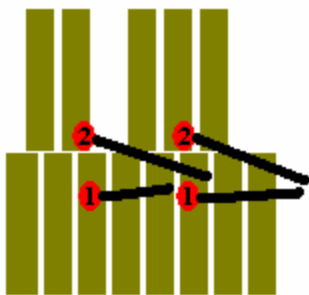
**Figure 5.37:** Bach's *Two Part Invention in E Major*; Annotation ii. Four discreet hand positions.



**Figure 5.38:** Bach's *Two Part Invention in E Major*; Annotation iii.

The two figures of Annotation iii come from the first restatement of the motive shown in Annotation ii. The first and last positions of this motive have been chosen because of the hand positions they require. In Annotation ii, all four hand positions placed the left-most mallet on the left-most bar to be played and the right-most mallet in its respective position. A number of times during this invention, however, this is not possible for reasons of body-placement logistics. On these occasions, the hand must move into a position similar to that of the standard one-note one-handed roll (see Figure 4.35).

The hand positions for Annotation iii, shown in Figure 5.39, require a slightly more pronounced angle from the wrist than that of the one-handed roll, but because of the body logistics mentioned above, the body is already in the correct position to make these hand positions not only possible, but relatively easy. The playing positions on the bars are important (as shown in Figure 5.39) as playing on the left portion of the black bar or the right portion of the white bar would place the wrist in an impossible (or at best a very uncomfortable) position. Future annotations will continue to address the very specific hand positions required by this type of figure.



**Figure 5.39: Bach's *Two Part Invention in E Major*; Annotation iii. Two hand positions.**

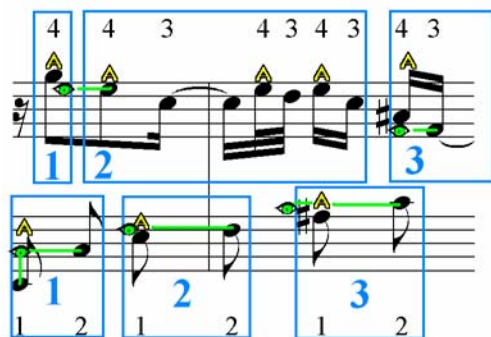
The passage of Annotation iv (Figure 5.40), despite the initial yardage between the hands, is not difficult to play if planned carefully (see Figure 5.41). The first position of the left hand is

set at an interval of a sixth. The eyes must move to the right hand which plays one G# then immediately moves to a new position. Even before the right hand's E is played, the hand is set in its second position, allowing the eye to return to the next two left hand positions. The eye does not need to return to the right hand until the A# anchors the third position. The stability of the second position of the right hand allows the eye to ignore that hand for more than one complete bar (from slightly before the fourth sixteenth note of measure 9 to the fifth sixteenth note of measure 10). By the time the eye must return to the right hand, the left hand has firmly established its third hand position and can be played "blindly." The subsequent five measures contain similar kinds of relationships between the hands due to the sequential nature of the passage.



**Figure 5.40: Bach's *Two Part Invention in E Major*; Annotation iv.**

Note that the "eye" for the initial left hand position not only checks the position of the E, but aligns the C# over its note (long before it is played) allowing the eye to switch to the right hand and verify or set the first two right-hand anchors. The staggered quality of the blue boxes (and, more importantly, the consequent green eyes) in Figure 5.41 represents an ideal relationship between sticking selection, positional techniques and performance logistics.



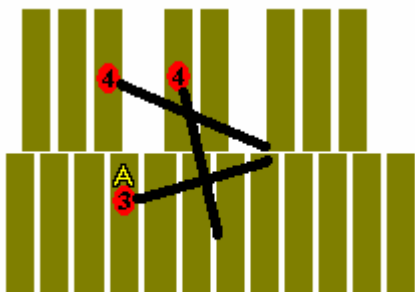
**Figure 5.41: Bach's *Two Part Invention in E Major*; Annotation iv. Hand positions and visual logistics.**



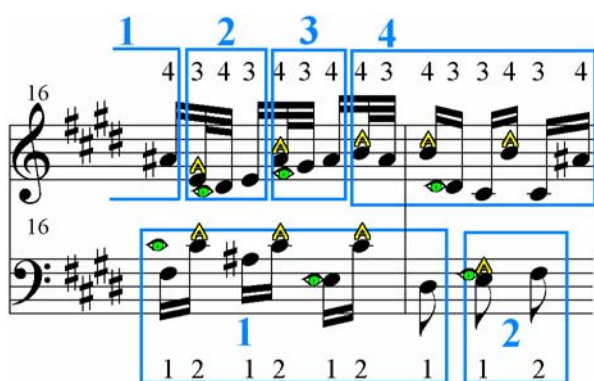
**Figure 5.42: Bach's *Two Part Invention in E Major*; Annotation v.**

The initial note of the right hand in Annotation v is the conclusion of a three-note hand position begun in the previous measure (C#, B, and the first A# of Annotation v; see measures 15 (end) and 16 (beginning) of Figure 5.30).

The stick positions of Figure 5.43 look peculiar because the hand position must pivot around the anchor. After the C# is played in the normal playing position, the elbow begins to swing to the right and, around the time the first anchor is struck, the elbow reaches a position that will allow the A# to be played without further movement. The position then shifts downward for the right hand's subsequent position (labeled with a blue 2 in Figure 5.44).



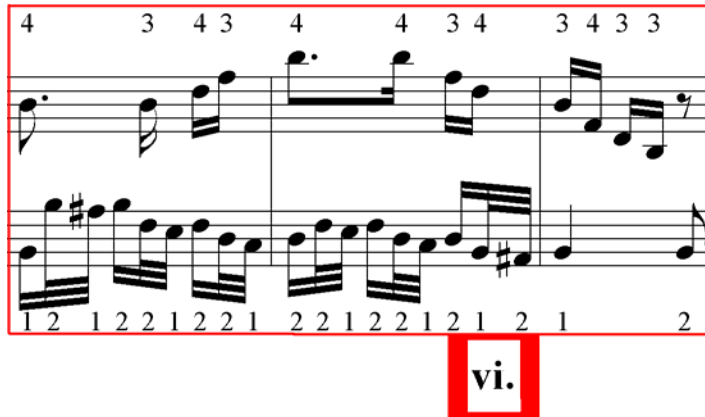
**Figure 5.43: Bach's *Two Part Invention in E Major*; Annotation v. Right hand position connecting previous measure with Annotation v.**



**Figure 5.44: Bach's *Two Part Invention in E Major*; Annotation v. Hand positions and visual logistics.**

Note again in Figure 5.44, the staggered relationship of the left and right hand positions. The only place where the hand positions are not widely staggered (between the beginnings of the first left position and the second right position) the green eyes are only one step apart—making one glance sufficient for both hands. The third position of the right hand is easily found (with the eye's assistance), but the eye must now abandon the right hand in favor of reinforcing the reach down to the E in the left hand. While the eye can, and possibly should, immediately jump back to the right hand for the beginning of the fourth position, the right hand may find its fourth position without the aid of the eye if necessary by a simple sliding anchor (from A# to B). If the

player is comfortable with this kinesthetic (instead of visual) connection between positions, the eye may directly proceed to (quickly) verify mallet 3's preparation for its D# before returning to set the left hand's second position.

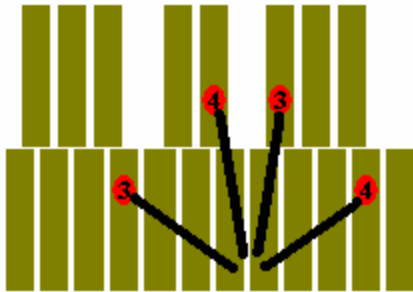


**Figure 5.45: Bach's *Two Part Invention in E Major*; Annotation vi.**

The right hand of Annotation vi consists of the simple arpeggiation of a B major triad. The B major triad has an interesting and unique property that allows what would generally be played as two positions to be played without moving the hand. Figure 5.46 shows the entire triad (with the octave doubled) as played in one position. While this might seem a rather esoteric consideration, the very tangible ability to keep one's eye on the left hand in a passage like that of Annotation vi is a luxurious (and rare) coincidence.

The left hand of Annotation vi is quite similar to the right hand of Annotation i above. Only the last position (not counting the final B), requires a rapid elbow shift. After playing the final D# with mallet 2 immediately before the final thirty-second note position, the elbow must immediately move to the right. This shift is aided by the fact that the left hand is reaching further to the left, which will necessarily pull the elbow to the right anyway, but the sooner it is in place (before beginning the final position) the better. Once the elbow is in place, these notes

are played in the same fashion as the final notes of Annotation ii above. The left hand may then leisurely move back to play the final B in the normal playing position with mallet 2.



**Figure 5.46: Bach's *Two Part Invention in E Major*; Annotation vi. Single hand position for B major triad.**

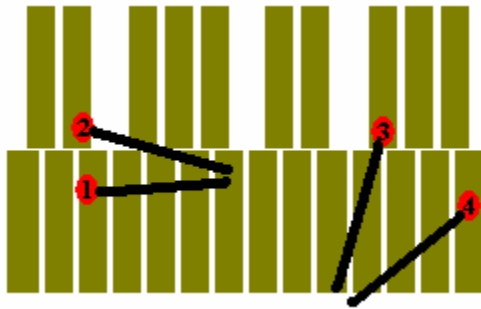
Of the three Bach inventions contained in this chapter, the final B of the left hand in Annotation vi has the honor of being the only note that was changed from Bach's text. Bach's text requires the B one octave lower, which, of course, is an impossible note on a 5-octave marimba. This statement does not apply to the upcoming Prelude and Fugue transcriptions which are transcribed to be played on a 4.3 octave instrument and required quite a few octave transpositions.



**Figure 5.47: Bach's *Two Part Invention in E Major*; Annotation vii.**

The passage of Annotation vii is similar to that of Annotation vi. The only difference in the left hand is that the first left-hand D# (chord tone) uses an upper neighbor instead of the

lower neighbor in the respective position of Annotation vi. This upper neighbor (if played as in Annotation ii above), when combined with the necessary position of the right hand at the same moment would put the two hands into the configuration featured in Figure 5.48.

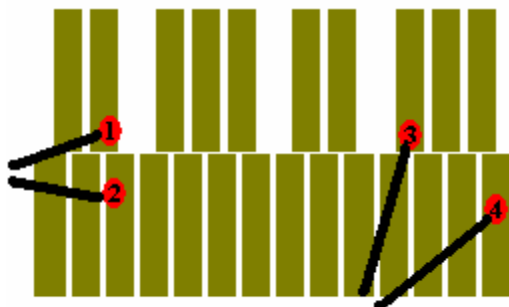


**Figure 5.48: Bach's *Two Part Invention in E Major*; Annotation vii. Initial consideration for first left hand position.**

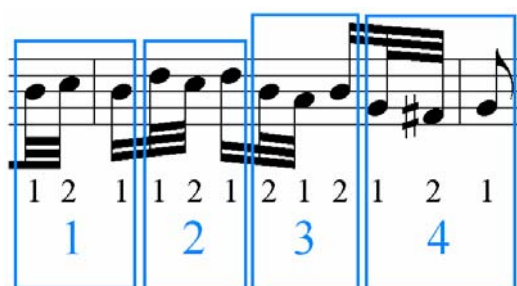
A glance at Figure 5.48 would be sufficient to make an experienced marimbist wince with discomfort. If, as in this case, the left elbow cannot be placed for the desired right-angled position, then the natural second choice is to place the elbow for a left-angled position. This results in the position shown in Figure 5.49.

If the hands were farther apart at this point, this position might also be impossible, but as written, the passage is quite comfortable in this position. The connection between this extreme left-angled pair and the next right-angled pair (E and F#) suggests that the elbow might delay its departure from the far left side. Figure 5.50 shows the four distinct hand positions of Annotation vii, and Figure 5.51 illustrates 4 "snapshots" of the positions the left hand will take during Annotation vii. While this sequence of elbow positions is not easy, it is playable—and it is aided by a very passive right hand. It is also conceivable that the right hand might assist the left hand in positions 3 and 4, but the fact that the right hand has a two-octave leap of its own to traverse before the next measure suggests that the left hand might be better left to its own devices.

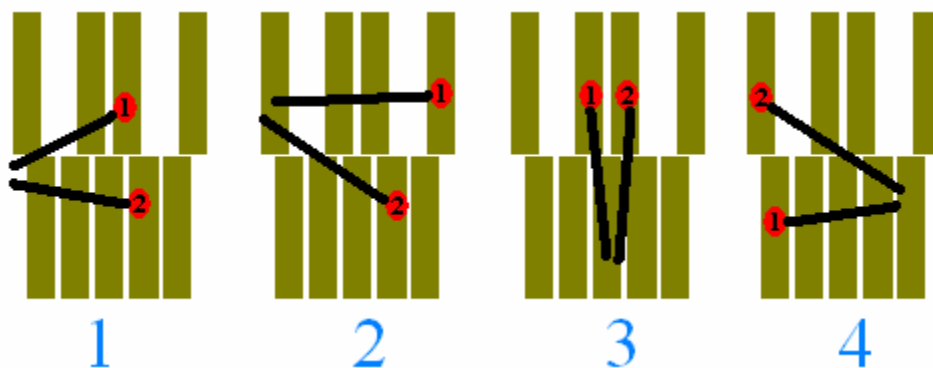




**Figure 5.49:** Bach's *Two Part Invention in E Major*; Annotation vii. Second consideration for first left hand position.



**Figure 5.50:** Bach's *Two Part Invention in E Major*; Annotation vii. Four hand positions.



**Figure 5.51:** Bach's *Two Part Invention in E Major*; Annotation vii. "Snapshots" of the four hand positions.

The dominant episode of Annotation viii (Figure 5.52) is played with the same sticking as the opening passage of the invention. The added A#'s do not significantly affect the difficulty, but the sudden right-hand shift at the beginning of the fourth measure from a soft left-angled pair

(D# and E) to a hard right-angled pair (E and F#) suggests that a player should dedicate more practice time to the dominant version than the tonic.

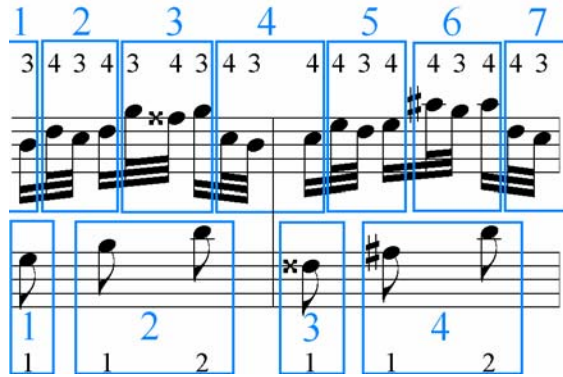


**Figure 5.52: Bach's *Two Part Invention in E Major*; Annotation viii.**

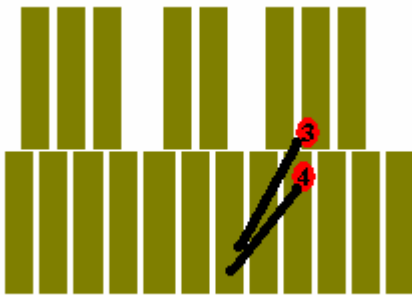


**Figure 5.53: Bach's *Two Part Invention in E Major*; Annotation ix.**

The left hand of Annotation ix plays two positions per measure as can be seen in Figure 5.54. Although the fast pace of right hand position changes does not allow the comfortable staggering of Annotation iv and Annotation v, there still exists enough flexibility to combine the kinesthetic sense and the eye to cover the motion of both hands.



**Figure 5.54: Bach's *Two Part Invention in E Major*; Annotation ix. Hand positions for Annotation ix.**



**Figure 5.55: Bach's *Two Part Invention in E Major*; Annotation ix. Right hand placement for position 3 of Figure 5.54.**

The third right hand position is the only one that differs from those of earlier discussions. In this pair of notes, the player must use a negative interval (minor second) to reverse the sticking order of the G and G#. Moving to the extremely right-angled position, suggested by putting mallet 3 on the G, is not possible given the necessary placement of the body to be able to reach the simultaneous left-hand notes. While this particular application of negative intervals takes some practice, its mastery is one more weapon in the player's arsenal of available sticking techniques.

Annotation x (Figure 5.56) combines the negative interval technique used in Figure 5.55 with one described in Chapter 4 under the sub-heading of Sliding Anchors. Figure 5.57 shows

the complex hand position that results from the use of the sliding anchor technique to combine two simple positions. This more complex hand position, if successfully performed, frees the eyes to follow the movements of the left hand—preferably allowing the left hand to prepare for upcoming positions.



Figure 5.56: Bach's *Two Part Invention in E Major*; Annotation x.



Figure 5.57: Bach's *Two Part Invention in E Major*; Annotation x. Complex sliding anchor position.



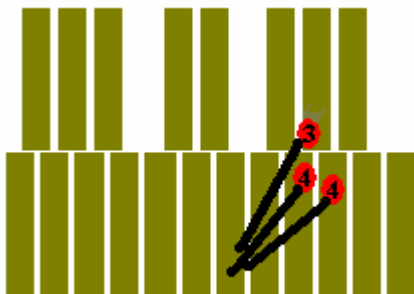
Figure 5.58: Bach's *Two Part Invention in E Major*; Annotation xi.

The second position of the right hand in Annotation xi is notable because of its similarity to that of Annotation x. The position is identical (ignoring the octave transposition) to Annotation x except that the second half has been brought down a step—merging the two sliding notes into a single anchor note.

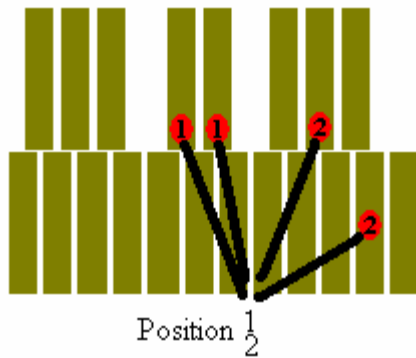


**Figure 5.59: Bach's *Two Part Invention in E Major*; Annotation xi. Hand positions.**

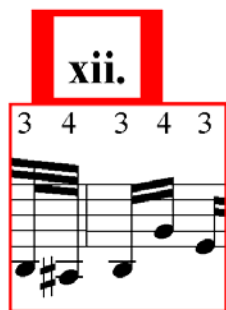
The left hand of Annotation xi shares qualities with both Annotation vi (the right-hand B major triad) and Annotation x (the sliding anchor). Position 1 (of the left hand) is completely contained by the interval of the mallets in position 2. Add to this the fact that the hand does not move from position 1 to position 2 (it simply expands the interval between the mallets), and the result is a fascinating (and rare) pair of positions.



**Figure 5.60: Bach's *Two Part Invention in E Major*; Annotation xi. Right hand position 2.**

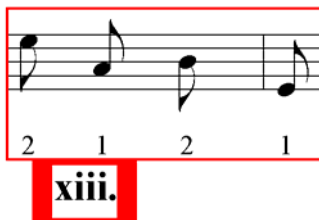


**Figure 5.61:** Bach's *Two Part Invention in E Major*; Annotation xi. Left hand positions 1 and 2.



**Figure 5.62:** Bach's *Two Part Invention in E Major*; Annotation xii.

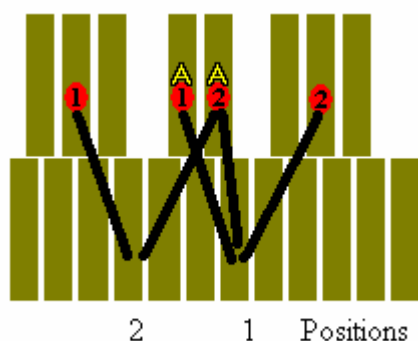
Annotation xii is another instance of the necessity for a horizontal (or nearly so) elbow position. As mallet 3 plays its second B, mallet 4 should be reaching for its position over the G#.



**Figure 5.63:** Bach's *Two Part Invention in E Major*; Annotation xiii.

Annotation xiii is a perfect example of the use of Chained Positions. What is required of the performer, in this instance of chained positions, is to be able to recognize by kinesthetics the

intervals of a fifth and a second in the left hand. The player sets the first position (see Figure 5.64) then is free to give all visual attention to the other hand. As the anchor C# is played, mallet 2 collapses its interval to a second (adjacent to its anchor). This completes the first position and simultaneously begins the second position, which names the D# as its anchor note. From this point the second position is completed by playing mallet 1 (which has reopened to the original fifth interval). This passage may be conceived as either 2 simple positions with a shared D#, or as a complex position with two chained anchors.



**Figure 5.64:** Bach's *Two Part Invention in E Major*; Annotation xiii. Left hand chained positions.



**Figure 5.65:** Bach's *Two Part Invention in E Major*; Annotation xiv.

Bach's invention in E major is notable for its nearly total lack of parallel motion between the hands. Only in the two eighth notes of parallel motion of Annotation xiv and in the inverted answering passage of measure 50 are parallel motion to be found in this invention. In Annotation ii above it was noted that this difficult thirty-second note motive was combined almost exclusively with simple parts for the opposing hand. Annotation xiv and measure 50, along with Annotation v and Annotation vi, are the only places where this motive is accompanied by anything other than eighth notes in the opposing hand. Annotation v and Annotation vi stated that the opposing hand, in each instance, was simple enough to allow the eyes to follow the more difficult thirty-second note motive. In the case of Annotation xiv, the eyes must watch both hands, but the strict parallel movement of the hands makes what could have been an extremely difficult passage into one that is idiomatic and even somewhat relaxed.



**Figure 5.66: Bach's *Two Part Invention in E Major*; Annotation xv.**

Mallet 1 of the left hand in Annotation xv plays a quick anchor slide in order to prepare mallet 2 for its C#. This doubled stick (over a fast pair of notes) could have been avoided by switching the final G# from mallet 1 to mallet 2, but the complexity and position of the right

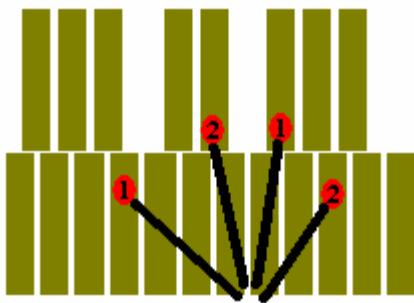


hand in measure 51 are aided by an earlier doubling in the left hand. If mallet 2 were played on the final G#, then repeated on the C#, this would effectively force the eye to align two notes simultaneously. At this interval (a fourth), it is possible for the eye to align two notes simultaneously, but the awkward position of the arms acts as a destabilizing factor and the doubling (as marked) is a rather insignificant exception to the alternation-sticking procedures favored by this paper, that recoups some of the lost stability.



**Figure 5.67:** Bach's *Two Part Invention in E Major*; Annotation xvi.

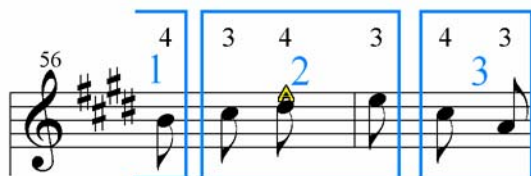
The passage of Annotation xvi is interesting because it is an extension of the B major triad phenomenon of Annotation vi. Instead of a triad with a doubled octave, this variation uses a dominant seventh chord, but the technique used to play it is virtually identical. The result is a beautiful, mirror-image position where a swing of the wrist may connect one hand position to another without repositioning the arm.



**Figure 5.68:** Bach's *Two Part Invention in E Major*; Annotation xvi. Another formally-balanced pair of positions.

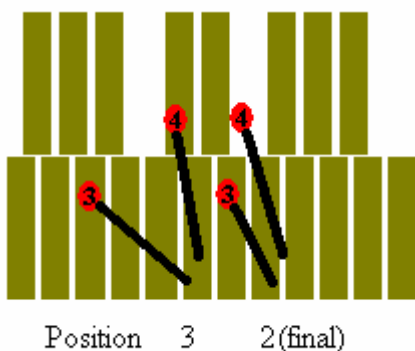


**Figure 5.69:** Bach's *Two Part Invention in E Major*; Annotation xvii.



**Figure 5.70:** Bach's *Two Part Invention in E Major*; Annotation xvii. Hand positions.

The location of mallet 4, as mallet 3 finishes the second position, should be over, or at least near, the D# (as shown in Figure 5.71). This positioning of mallet 4 prepares the hand for a small shift to the C# of position 3.



**Figure 5.71:** Bach's *Two Part Invention in E Major*; Annotation xvii. An illustration of the similarity between the ending of position 2 and position 3.

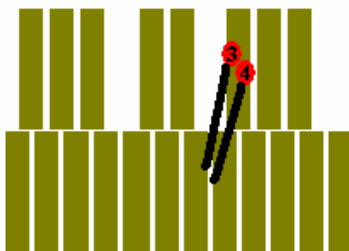
The shape of the mallets at the end of position 2, being so nearly identical to the shape needed for position 3, combined with the fact that mallet 4 is already lifted and ready for its next note, suggest that the player may continue with alternation sticking—even though, technically speaking, it invokes the sensation of a negative third interval. This exception is rather common

when the black bars aid a wider negative interval and similar passages will be found in later annotations of this chapter.



**Figure 5.72: Bach's *Two Part Invention in E Major*; Annotation xviii.**

The left hand position for Annotation xviii is similar to many passages previously discussed. The right hand, however, is something that has not yet been encountered in this chapter. The hand position for the right hand roll is shown in Figure 5.73. The hand need not roll quickly or with any great dynamic, but should simply act to sustain the F# above the busier left hand. The (unaccented) release note prepares the first position of a descending scalar line. Note also that there is a shorter similar passage (in the left hand) found between measures 39 and 40 of this invention.



**Figure 5.73: Mallet location and hand position for roll of Annotation xviii.**

Early drafts of this transcription used the reverse sticking for the three notes of Annotation xix (Figure 5.74). It was only after the principles of alternation sticking were

carefully considered that this sticking selection appeared. The 4,3,4 sticking forced the wrist to the left side of the notes and caused a large shift into the subsequent position. This sticking, however, allows the wrist to stay on the same side of the bars as the subsequent position, making for an easier, more stable, transition to the next position. When using this new 3,4,3 sticking, the hand and arm pivot around the wrist (from a right-angled position to a flat position on the black bars of the following notes) reducing the need for horizontal motion in the arm and simplifying the transition.



**Figure 5.74: Bach's *Two Part Invention in E Major*; Annotation xix.**



**Figure 5.75: Bach's *Two Part Invention in E Major*; Annotation xx.**

Annotation xx is provided to illustrate how circumstance may dictate sticking. These three notes are identical in pitch classes to those of Annotation xix; however, they are played with the opposite sticking due to two important factors of circumstance. First, the octave change and the overall tessitura make it favorable for the wrist to be on the left side of the mallets in this instance; and second, beginning the final measure of the right hand with mallet 4 allows this measure to be played with two elegant positions (instead of three very awkward positions if it began with mallet 3).

### 5.3 J. S. Bach's *Two-Part Invention in B Flat Major*

[illegible]

**Figure 5.76: Page 1 of Bach's *Two Part Invention in Bb Major*; Annotation Map.**

**Figure 5.77: Page 2 of Bach's *Two Part Invention in Bb Major*; Annotation Map.**



**Figure 5.78:** Page 3 of Bach's *Two Part Invention in Bb Major*; Annotation Map.



**Figure 5.79:** Bach's *Two Part Invention in Bb Major*; Annotation i.

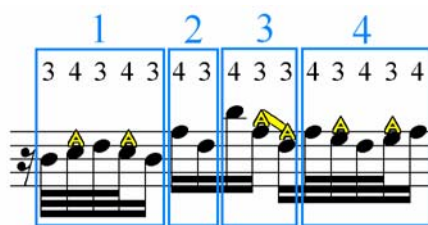
When conceived as only two distinct positions, the accompaniment line of Annotation i, (Figure 5.79) and those like it later in the piece, become easy, low-maintenance parts for the subordinate hand—freeing the eyes, most of the time, for the more intricate line in the opposing hand. This line should not be played with continuous, flowing arm motion that follows the shape. Instead the hand should position itself to play as many notes from one position as possible, then, as smoothly and quickly as possible, shift into the next position.

Annotation ii (Figure 5.80) begins and ends with the primary (thirty-second note) motive for the invention. Throughout the invention these motives will often be connected, as seen here, by arpeggiated chords. Note that the primary motive is always found in one of two orientations:

"A"-shaped (moving up stepwise, then down, as in the first count of Figure 5.80) or inverted into a "V"-shape (as in the third count of Figure 5.81). Whenever possible in this transcription, the "A"-shaped figure will be played with alternating sticks beginning with the left-most mallet of the hand, and the "V"-shaped passages will alternate from the right-most mallet. These default stickings will occasionally be negated by body placement logistics and the interaction of black and white bars. Because of the shape of the motive and the Bb major key signature, every appearance of this motive will move between the black and white manuals (except those over the dominant F or secondary dominant C chords). Because of the prolific use of this motive, which contains a negative interval when played on the marimba, this invention requires that the player be very comfortable with the concept and execution of negative intervals.



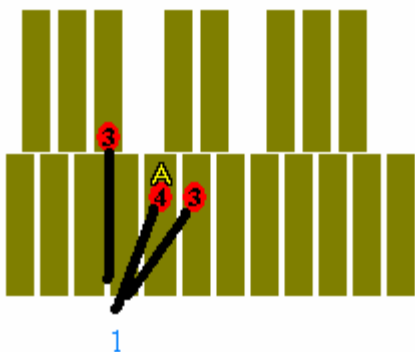
**Figure 5.80: Bach's *Two Part Invention in Bb Major*; Annotation ii.**



**Figure 5.81: Bach's *Two Part Invention in Bb Major*; Annotation ii. Hand positions.**

Figure 5.81 shows the four hand positions used by the right hand in Annotation ii. The anchor notes have been carefully chosen to provide as much stability as possible for the crossing negative intervals. Figure 5.82 shows the placement of the mallets for position 1.





**Figure 5.82: Bach's *Two Part Invention in Bb Major*; Annotation ii. Position 1.**



**Figure 5.83: Bach's *Two Part Invention in Bb Major*; Annotation iii.**

This invention contains many passages where one hand will pause for substantial lengths of time. It is possible that during these pauses, a resting hand could assist the opposite (more heavily-tasked) hand; however, it is a basic assumption of alternation sticking that the hands may be truly independent (as they are on a piano). As there are times when both hands are tasked with simultaneous difficult passages that do not allow the hands to cooperate. In the interest of consistency, this transcription requires that each hand be generally independent and responsible for its own line whenever possible.

Annotation iv (Figure 5.84), if isolated from the left hand, would use mallet 3 on the final G, however that right-angled position would require a difficult shift to prepare for the subsequent notes. As marked, mallet 4 is doubled into sliding anchors. Mallet 4 (on the G) prepares the hand to begin the following Eb with mallet 3.



**Figure 5.84: Bach's *Two Part Invention in Bb Major*; Annotation iv.**



**Figure 5.85: Bach's *Two Part Invention in Bb Major*; Annotation v.**

The motives in Annotation v are identical to the thirty-second note motives of the first measure. These particular iterations, however, are the first exceptions to the default sticking described in Annotation ii. If the right hand were to begin with mallet 4 here, then mallet 4 would need to cross the anchor (mallet 3 on F) and reach up to the black bars for the Eb as a negative interval. Negative intervals are not difficult in most instances (generally requiring only a slight shift out of position by the anchor), but in order for mallet 4 to play this Eb, mallet 3 must be moved so far out of position that it loses its kinesthetic sense of the anchor's location. By switching the initial stick, to begin with a springing position, the right hand avoids the awkward negative interval to Eb. The repeated mallet 4 (from D to Eb) prepares the change of

direction down to the C with mallet 3. The left hand is nearly an exact mirror image of the right and the same principles were used to determine its sticking.

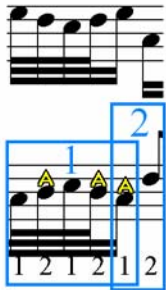


**Figure 5.86: Bach's *Two Part Invention in Bb Major*; Annotation vi.**

It is interesting to note that Annotation vi and Annotation xv are the only two places in the entire invention where Bach chose to use direct contrary motion. The right hand of Annotation vi is virtually identical (in sticking procedure) to the right hand of Annotation v, and the left hand, by itself, is playing the default sticking recommended in Annotation ii. When the hands must play simultaneously, however, difficulties arise. The hands are more than an octave apart, and both parts need to make position, or significant interval, changes. The left hand may use the concept of chained positions to assist the eye in this case.

Figure 5.87 shows the separation of the left hand into two overlapping positions. The first position is set, and then played normally, except that on its last note, the mind resets the anchor onto the C. From the C, which is now the beginning of the second position, the F is found by opening the hands to the interval of a fourth. This interval, with a little practice, may be found quickly and confidently without the aid of the eye, which may follow the less stable right hand position with its springing element and doubled mallet 4.

3 4 3 4 4 3



**Figure 5.87: Bach's *Two Part Invention in Bb Major*; Annotation vi. Illustration of two overlapping positions.**



**Figure 5.88: Bach's *Two Part Invention in Bb Major*; Annotation vii.**

Annotation vii is the simplest, clearest use of the springing position to be found in any of the transcriptions of this chapter. If the triad were to be played with mallets: 2,1,2, then the hand would end in a position that would need to be shifted before the subsequent passage could be played. With the springing position, mallet 1 begins (with mallet 2 raised in preparation for its A) then the hand immediately shifts into the final position over A and F. In this final position, the hand is exactly where it needs to be for the next measure.

The right hand sticking of Annotation viii (Figure 5.89) is identical to the first measure of the invention—only count three is altered, out of necessity, to account for the inter-manual shape change of the transposition. The alteration of count three is like the one described in Annotation v. The left hand looks simple, but the particular shape of this line makes establishing hand

positions problematic. The left hand, if played alone, could use mallet 2 on the F (natural) to increase stability, but in order to put the arm in that position, the body would need to be placed nearly in front of that F—which is not practical while simultaneously playing an F two octaves higher in the right hand.



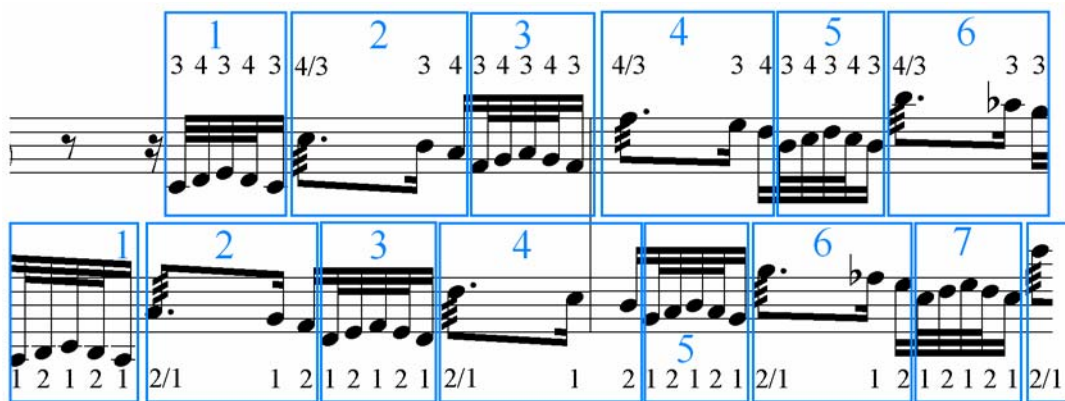
**Figure 5.89:** Bach's *Two Part Invention in Bb Major*; Annotation viii.



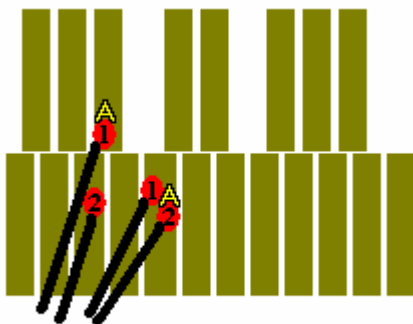
**Figure 5.90:** Bach's *Two Part Invention in Bb Major*; Annotation ix.

The thirty-second note portions of Annotation ix are all similar to those found so profusely throughout this invention. The opposing hand, however, is unlike anything encountered elsewhere in these inventions. The eye needs to follow the most intricate line, which in this case is always the thirty-second note part which switches from hand to hand—leaving the one-handed roll portion of the counterpoint to be played blindly. As can be seen in

Figure 5.91, however, the player is assisted, slightly, by the staggering of hand positions. Although these positions are not as clearly staggered as some others that were discussed in the E and F major inventions, nowhere in Figure 5.91 do both hands begin a new position at exactly the same time. The initial positions of the rolls are not terribly difficult to find, then the first single note after the roll may be found by its proximity to the rolled note. (The first single note is always a whole step below the rolled note.) The final note of the "roll" positions may be found either through a sliding position (as in the right hand's position 6), or through a combination of a negative interval and a chained anchor. (An illustration of the left hand's position 2 is found in Figure 5.92.)



**Figure 5.91: Bach's *Two Part Invention in Bb Major*; Annotation ix. Staggered hand positions.**



**Figure 5.92: Bach's *Two Part Invention in Bb Major*; Annotation ix. Complex hand position/Left hand position 2 of Figure 5.91.**

The starting position shows both mallets 1 and 2 rolling on the C. The roll need not connect (in legato style) to the Bb, but the Bb conceives the C (on mallet 2) as an anchor and finds the Bb a step down from the anchor. The mind now reassigns (in chained fashion) the anchor to the Bb on mallet 1 and mallet 2 reaches under the Bb anchor to play an A at a negative second. When practiced many times, these connections add a significant amount of stability to the passage, and will remove some of the workload from the eyes.



**Figure 5.93: Bach's *Two Part Invention in Bb Major*; Annotation x.**

The parallel passages of measures 14 through 16 are among the more challenging and rewarding passages of this invention. Nearly all of the position shifts happen simultaneously between the two hands and the rhythmic vitality is relentless for two and a half measures. Annotations x, xi, and xii will discuss some new issues brought about by the simultaneous playing of the thirty-second note motive in both hands, but most of this passage requires the same techniques discussed in previous annotations (especially Annotation ii and Annotation v); therefore the entire passage has not been annotated. In Annotation x, the left hand needs its elbow to be placed to the left of its Eb anchor (to allow the negative interval from mallet 2). Shifting the body, as a whole, slightly to the left immediately before playing the notes of this annotation will greatly increase the player's comfort and grace.

Annotation xi (Figure 5.94) is the only instance, in the parallel passage between measures 14 and 16, where a repeated sticking is used for the last two notes of the thirty-second note motive in both hands simultaneously. The sudden parallel sliding anchors impress a tangible comfort on the player. While this motivic statement is different, technically, from the surrounding iterations, one must be careful not to allow any audible changes due to the suddenly sliding sticking pattern.



**Figure 5.94: Bach's *Two Part Invention in Bb Major*; Annotation xi.**



**Figure 5.95: Bach's *Two Part Invention in Bb Major*; Annotation xii.**

Annotation xii is essentially the same as Annotation x. As in Annotation x the body must shift to the left here to allow mallet 2 to play the negative second on the A.



Annotation xiii (Figure 5.96) is an important structural point in the invention. There is a vivid texture change from the preceding two-handed parallel passage, and the distinctive canonic imitation signals the listener that something is coming—the end, in this case. The hands are relatively close together, allowing the eye to easily assist both hands, but strategies such as chained positions (on the sixteenth note arpeggiations) may add some redundant security to the hands.



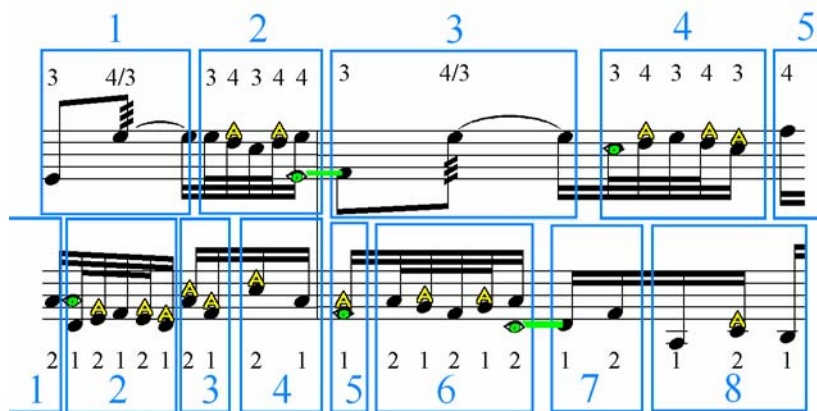
**Figure 5.96: Bach's *Two Part Invention in Bb Major*; Annotation xiii.**



**Figure 5.97: Bach's *Two Part Invention in Bb Major*; Annotation xiv.**

Annotation xiv is a tricky passage. At their farthest point, the lines are over three octaves apart. One-handed rolls and rapid position changes in the left hand (added to the tessitura) make careful logistical planning of vital importance to this passage.

In consideration of the one-handed rolls, it may be noted that they add stability to the right-hand logistics. The rolls are short enough not to be difficult, but long enough to provide a reliable stationary point. The first roll is also closely related to the subsequent position—the transition may be made without the eyes. While the transition from the second roll to its subsequent position needs visual attention, the eyes happen to be free at that moment to assist. The rolls are also exclusively on the black bars, which allows them to be found through peripheral vision. A white bar would need direct vision so that the correct bar could be compared with an appropriate "landmark" black bar. Fortunately for the player, the rolls of this passage occur on an actual landmark bar.



**Figure 5.98: Bach's *Two Part Invention in Bb Major*; Annotation xiv. Positions and logistics map.**

The eyes in this passage will need to stay, mostly, with the left hand (see Figure 5.98). One position where they must cross to the right hand (upper staff-position 4) has already been discussed— but the player should note that the eye in the left hand's position 6 must pre-verify the F in order to give the eyes time to shift two and a half octaves to the right. The eye must also pre-verify the right hand before position 3 (upper staff) because the left hand has a new position starting at the same point. The only remaining comment for this passage concerns the hand

positions with multiple anchors—these are chained anchors to assist in the transition between some positions.

Annotation xv (Figure 5.99), illustrating a second instance of direct contrary motion in this invention, is relatively easy when compared to the seven and a half measures preceding it. Quick movement into position, well before the notes need to be played, is essential to this passage. With the springing position in the right hand and the first two notes ready and waiting over the correct bars in the left hand, the execution of the thirty-second notes is not at all difficult. The inner mallets reach to the octave F's and the annotation is complete.



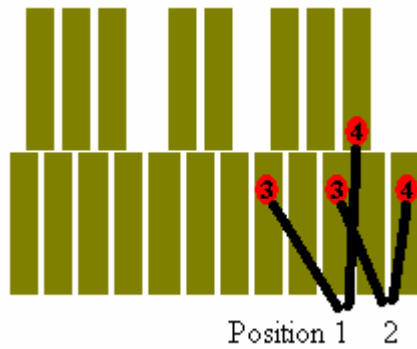
**Figure 5.99: Bach's *Two Part Invention in Bb Major*; Annotation xv.**



**Figure 5.100: Bach's *Two Part Invention in Bb Major*; Annotation xvi.**

The left hand below the sixteenth notes of Annotation xvi plays a very simple two-note position and does not require the eye's attention at all. The right hand here must play two distinct positions for the sixteenth notes as shown in Figure 5.101. A smooth circular motion with the right arm (a natural tendency as it resembles the necessary motion for playing with a singular

mallet) is highly detrimental to accuracy during this passage. The hand should, however, pivot to the right during the A of mallet 3 in order to prepare for the Bb roll of mallet 4.



**Figure 5.101: Bach's *Two Part Invention in Bb Major*; Annotation xvi. Sixteenth note hand positions.**

#### **5.4 J. S. Bach's Prelude in C Minor (*The Well-Tempered Clavier Book II*)**

The left hand of Annotation 1 (Figure 5.104) is played entirely in one position with an anchor on middle C (sliding to B for the last note of the measure). The left hand's stability allows the player to focus on the challenging right hand. Figure 5.105 illustrates the four hand positions for the right hand. Mallet 3's Ab on the second count functions within both the first and second positions. With respect to the first position, the Ab is simply a negative second interval. While playing this negative second interval, however, the hand must prepare to shift slightly to the left to place mallet 4 for its F. The rebound from the Ab on count 2 should be made in such a way to shift the hand to the left, where mallet 4 will (almost immediately) play the F anchor of position 2. Once the transition to position 2 is made, the remaining two positions are stable. Position 3 does transfer the anchor from the Eb to the F in order to assist the hand in finding the subsequent D, but after playing the inventions, this type of transfer will have become rather routine.

# Prelude in C Minor

from the Well-Tempered Clavier Book II

J. S. Bach/Thomas Zirkle

The musical score for the Prelude in C Minor, BWV 9.1, is presented in two systems. Each system contains four measures of music. The score is in C minor, 2/4 time, and consists of 36 measures in total. The notation includes treble and bass staves with various musical symbols such as notes, rests, and accidentals. Fingerings are indicated by numbers 1-4, and articulations are marked with dots. Red boxes highlight specific measures, labeled with Roman numerals: i. (measures 1-4), ii. (measures 5-8), ii.cont. (measures 9-12), iv. (measures 13-16), iv.cont. (measures 17-20), v. (measures 21-24), vi. (measures 25-28), vii. (measures 29-32), and viii. (measures 33-36).

Figure 5.102: Page 1 of Bach's Prelude in C Minor (*The Well-Tempered Clavier Book II*) Annotation Map.

The image displays a musical score for Page 2 of Bach's Prelude in C Minor, featuring fingerings and annotations labeled ix. through xvii. The score is written for piano and includes a treble and bass staff. Fingerings are indicated by numbers 1-4 above or below notes. Annotations are placed in red boxes above specific musical phrases.

**Annotations:**

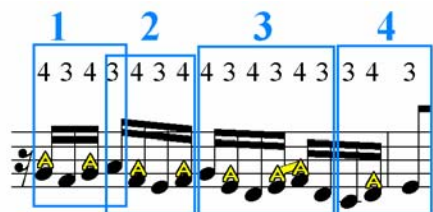
- ix.** (Bass staff, measures 14-16)
- x.** (Treble staff, measures 14-16)
- xi.** (Treble staff, measures 17-19)
- xii.** (Treble staff, measures 19-21)
- xiii.** (Treble staff, measures 20-22)
- xiv.** (Bass staff, measures 20-22)
- xv.** (Treble staff, measures 22-24)
- xv.cont.** (Bass staff, measures 22-24)
- xvi.** (Bass staff, measures 25-27)
- xvii.** (Bass staff, measures 27-29)

Figure 5.103: Page 2 of Bach's Prelude in C Minor (*The Well-Tempered Clavier* Book II)  
Annotation Map.



**Figure 5.104: Bach's Prelude in C Minor. Annotation i.**

The left hand restatement of the passage shown in Annotation i has a slightly different division between the third and fourth positions (see Figure 5.106). It is interesting to note that (when comparing this passage in both hands) it is the intervallic direction of the second note of the subsequent measure that is the crucial note for determining the sticking for the fourth positions.



**Figure 5.105: Bach's Prelude in C Minor. Annotation i. Hand positions.**

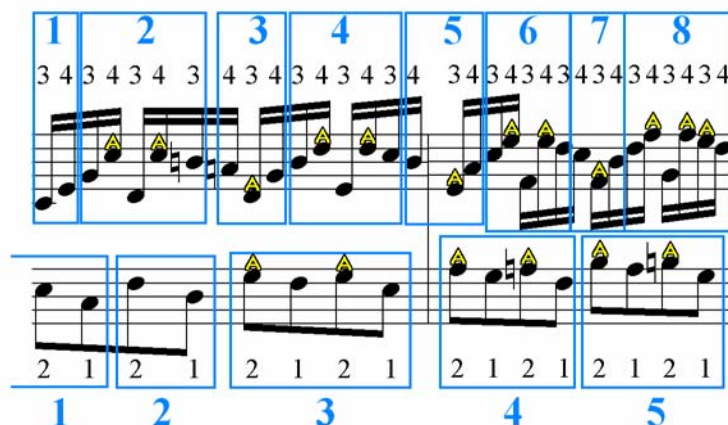


**Figure 5.106: Bach's Prelude in C Minor. Annotation i. Hand positions for left hand in measures 2 and 3.**

The climbing left hand and the asymmetrical, but well-balanced right hand positions make Annotation ii (Figure 5.107) one of the most interesting passages of all the transcriptions in this chapter. Figure 5.108 shows the hand positions for both parts.



**Figure 5.107: Bach's Prelude in C Minor. Annotation ii.**



**Figure 5.108: Bach's Prelude in C Minor. Annotation ii. Hand positions.**

The eye will generally need to follow the busier right hand, but the left hand is fairly self-sufficient and needs little visual assistance. The first position of the left hand has already been addressed as the conclusion of Figure 5.106. The first three positions of the left hand may chain together by regularly transferring the anchor, then setting the distance to the next mallet by kinesthetic memory. This process takes a lot of the brain's processing time, but the right hand's needs tax the limited resources of the eyes more than the extraordinary power of the brain—leaving a more-than-sufficient store of concentration for the left hand. Positions 4 and 5 (of the left hand) require the anchor to slide chromatically within the position.



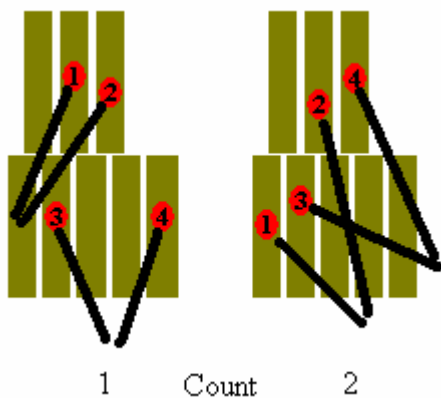
The right hand positions are a fascinating study. The odd numbered positions (not counting position 1, which is incomplete) of this annotation are three-note collapsing positions. The connections from odd-numbered to even-numbered positions will be familiar to players who have studied the arpeggio exercises in Chapter 4. For instance, the entire third count of the annotation (right hand) exists between positions 3 and 4 and outlines a second-inversion G minor triad. This arpeggio connection between positions lends stability to a difficult-looking right hand part. The even numbered positions consist of a firmly anchored mallet 4 and a swinging mallet 3. Position 8 also requires the player to transfer the anchor onto the Eb in order to prepare a D negative second interval for mallet 4.

**Figure 5.109: Bach's Prelude in C Minor. Annotation iii.**

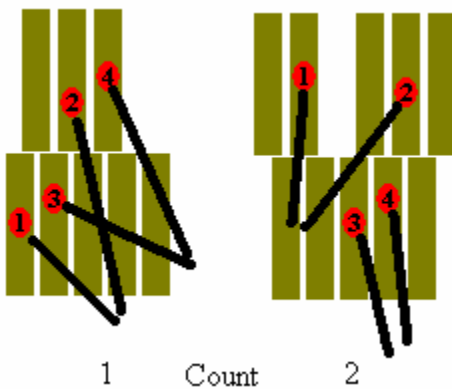
The parallel thirds of this passage may be played with many different sticking patterns. The pattern chosen for this transcription complements, count by count, the specific shape of the thirds on the keyboard. The third count of the third measure (see Figure 5.112) puts the right hand into a very similar position to the one needed for count four of the same measure. This similarity links directly to the next annotation of this study. The third count of the third measure (see Figure 5.112) puts the right hand into a very similar position to the one needed for count four of the same measure. This similarity links directly to the next annotation.

Figure 5.110, Figure 5.111, and Figure 5.112 show the best hand positions to play the sticking marked in the transcription. The outside tenths suggest, for the transcriber, some direction, as they give little option for sticking other than to be played by mallets 1 and 4.

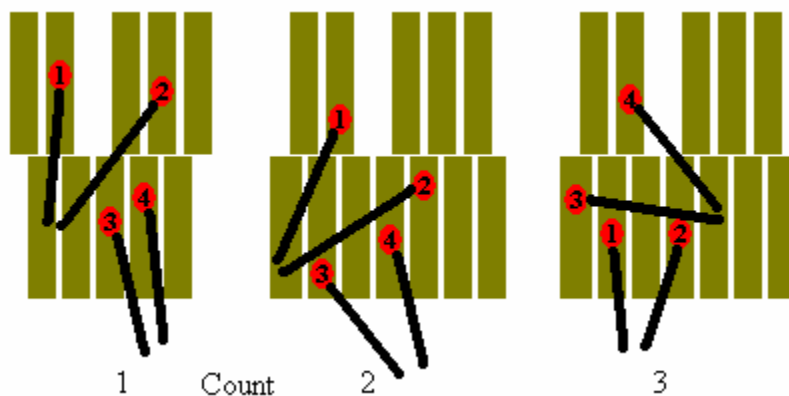
The third count of the third measure (see Figure 5.112) puts the right hand into a very similar position to the one needed for count four of the same measure. This similarity links directly to the next annotation.



**Figure 5.110: Bach's Prelude in C Minor. Annotation iii. Hand positions for parallel thirds (first measure).**



**Figure 5.111: Bach's Prelude in C Minor. Annotation iii. Hand positions for parallel thirds (second measure).**



**Figure 5.112: Bach's Prelude in C Minor. Annotation iii. Hand positions for parallel thirds (third measure).**



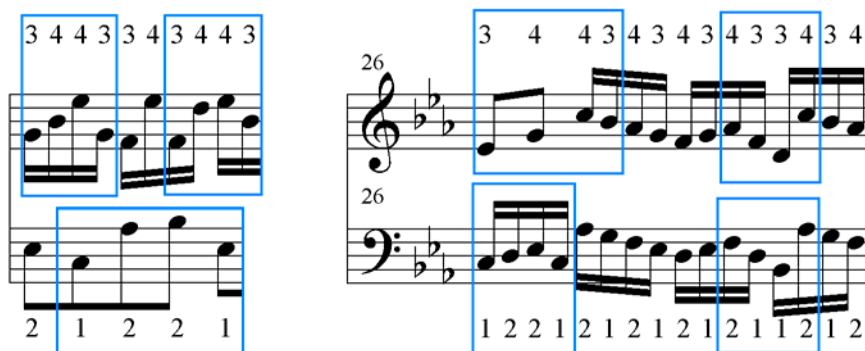
**Figure 5.113: Bach's Prelude in C Minor. Annotation iv.**

The thirty second notes of Annotation iv are a "written out" mordent. The hand is coming from a similar-shaped position in the previous count (see Annotation iii), which places the first mordent in an accessible position. Mallet 2 should be placed on the very end of the bar in order to allow the left arm enough mobility to play its descending sequential pattern. All three counts of the right hand, in Annotation iv, begin in the same position, but the second count is unique in that it requires mallet 1 to cross to a negative second interval.



**Figure 5.114: Bach's Prelude in C Minor. Annotation v.**

The melodic shape demonstrated in Annotation v is common enough in Bach's music that it is prudent to discuss the sticking associated with it. Two leaps in one direction followed by a change of direction is a very restrictive shape in terms of sticking options. The wider the interval on the direction change, the fewer options afforded the transcriber. If the shape begins with the right-most mallet (such as begins on the second sixteenth note of measure 3—right hand), there is no problem and strict alternation will usually work very well. When, however, this shape (ascending twice then descending once) must begin with the left-most mallet of the hand as in Annotation v, the sticking is nearly always: 3,4,4,3 or 3,3,4,3 for the right hand. Figure 5.115 contains two measures from this same prelude demonstrating a total of seven additional instances of this shape and sticking procedure.



**Figure 5.115: Bach's Prelude in C Minor. Annotation v. Additional examples of the sticking technique found in Annotation v. Examples are from measures 9 and 26.**



**Figure 5.116: Bach's Prelude in C Minor. Annotation vi.**

In this passage, each count's four sixteenth notes function as a single hand position. The negative intervals of this passage cycle through all the possible permutations of relationships between black/white bar anchors and black/white bar negative intervals. The first count shows a black anchor and a black negative interval. The second count shows a black anchor and a white negative interval. The permutations "white anchor with white negative interval" and "white anchor with black negative interval" in the third and fourth counts of the annotation, respectively, complete the cycle.

With the exception of the double stops of its second measure, Annotation vii (Figure 5.117) uses absolute alternation sticking throughout. This passage is annotated as an illustration of the stability afforded the player by the use of alternation sticking. Unfortunately, the comfortable sensation gained by the alternation is not attained until spending some considerable time with the techniques and exercises of Chapter 4, but in the event that the reader should choose to invest this time, Annotation vii will be a useful one in gauging progress.



**Figure 5.117: Bach's Prelude in C Minor. Annotation vii.**

Annotation viii contains only three hand positions for the entire measure (see Figure 5.118). The right hand moves mallet 4 around a pedal (and anchor) Bb. Mallet 4 swings

between a high melodic tone and a decorative lower neighbor (negative second interval). The left hand consists of two very simple positions—allowing the player to concentrate on the right hand.



Figure 5.118: Bach's Prelude in C Minor. Annotation viii.



Figure 5.119: Bach's Prelude in C Minor. Annotation viii. A measure with only 3 hand positions.



Figure 5.120: Bach's Prelude in C Minor. Annotation ix.

The left hand in Annotation ix slides the anchor up from G to Ab in the first count and back down to the G (at the end of the second count) to prepare for the second position (the second half of the measure). The process is repeated one step lower (entirely on white bars this time) for the second position.



**Figure 5.121: Bach's Prelude in C Minor. Annotation x.**

The right hand of Annotation x is very similar to that of Annotation viii. The chord is different and there is an extra, wide leap at the beginning, but the technical performance is identical. Assigning sticking to the left hand for these nine notes is a challenging task. The first note must be mallet 1 and the last note must also be mallet 1 because of the shapes of passages just outside the red box of Figure 5.121. The best option for starting with mallet 1 then landing, again, on mallet 1 on the ninth note is strict alternation. In this case, however, trying the complete alternation option breaks down with two consecutive negative seconds after the F (the next two intervals would be a negative third and a negative fourth)! Repeating mallets are needed to avoid the string of negative intervals. (The negative intervals do serve a useful purpose in pointing, backwards, to a possible location for the doubled mallet.) The sliding anchor double (on mallet 2) seems the best choice as it needs little help from the eyes and puts the second half of the measure into a single position (one that was already used in measures 3

and 13). One doubling, however, would leave the player with mallet 2 on the last Ab of the annotation. Another doubled stick must be used, but doubling anything in the second half of the measure would bring back the consecutive negative intervals; therefore, the doubles must either be used from the Eb to the Ab (as in the annotation), or from the Ab to its next note (a C). The first option was chosen for two reasons: first, doubling across an eighth note is a more stable choice than doubling across a sixteenth note; and second, doubling once at the beginning of the sixteenth note passage would disrupt the sticking balance of the measure. (The corresponding point on count three would not have the doubling.) There is no question that the sudden doubled stick over a fourth interval is a slight destabilizing element, but it seems to be the lesser of two evils.



**Figure 5.122: Bach's Prelude in C Minor. Annotation xi.**

The first half of this measure uses both a sliding anchor and a negative interval. In this setting, the sliding anchor gives the player time to move mallet 4 to its new position/anchor on the Bb. The latter half of the measure allows the player to use the one-handed scale technique practiced in Chapter 4.

There is a different sort of parallelism between the hands of Annotation xii (Figure 5.123). Between the hands, the outside and inside mallets (1 and 4, and 2 and 3, respectively) play in absolute parallelism for the first two counts. The notes they play, because of interval content and direction, are not in parallel—but contrary—motion. If the player focuses on the



mirror-image quality of the muscle movements, he will be left with an interesting sensation of hands that are connected in a unique way.



**Figure 5.123: Bach's Prelude in C Minor. Annotation xii.**



**Figure 5.124: Bach's Prelude in C Minor. Annotation xiii.**

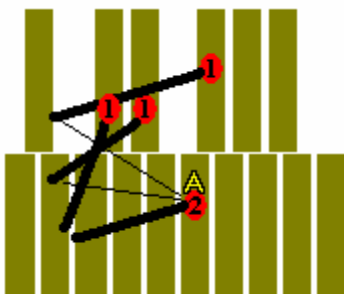
The eighth note passage must begin with mallet 4 and end with the 4,3 combination shown in the annotation. The reasons (though not the specific sticks) are the same as those for the situation discussed in Annotation x—namely, the melodic shape of the notes immediately outside the red box of Annotation xiii demand the first and last stickings seen in Figure 5.124. If the first note is played by mallet 4 and the ninth note must be played by mallet 3, then there must be an odd number (preferably one) of doubled sticks within the measure. The first attempt might be to place a doubled mallet 4 over the last two eighth notes (F and G), but this forces two, decidedly right-angled, pairings as shown in Figure 5.125. While these right-angled pairings are not bad in isolation, when played over a left-hand part that is pulling the body far to the left (see Annotation xiv), these right-angled notes become very awkward. The solution, as seen in the

**xiv.**



1 2 1 2 1 2 1 2 1 2 1 2 1

The single-position passage of Annotation xiv is an exciting one to play. The stick playing the F anchor (mallet 2), while solid, must rotate to allow mallet 1 to play its series of notes. Figure 5.127 shows the sticks in their approximate orientations throughout the passage. Note that the first stick for mallet 2 is displayed normally, and subsequent positions for mallet 2 are shown by a thin line connecting the mallet's head to the base of the particular mallet 1 it follows. As mentioned in Annotation xiii, the body must be in front (or slightly to the left) of the anchor—a condition that has a restrictive effect on the right hand's sticking options.



**Figure 5.127: Hand position for Annotation xiv.**



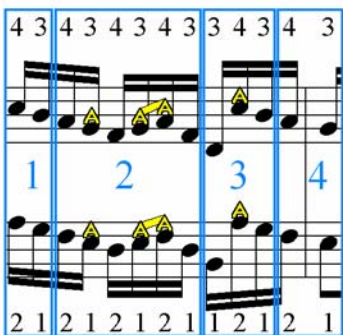
**Figure 5.128: Bach's Prelude in C Minor. Annotation xv.**

Annotation xv is notable for being an exceptionally long string of notes that utilize a sticking of absolute alternation. The second measure is repeated (down a step) in the subsequent measure and the same sticking is used again. Arpeggiations, scalar sections, and one negative interval combine to make a technically interesting passage.

In Annotation xvi (Figure 5.129), the sticking was selected to be perfectly parallel between the hands. Other than overcoming the distance between the hands, the only challenging parts of this passage are the sliding anchors in the second position, and the doubled sticking between positions 2 and 3—which consists of lifting and completely resetting both hands for the third position.



**Figure 5.129: Bach's Prelude in C Minor. Annotation xvi.**



**Figure 5.130: Bach's Prelude in C Minor. Annotation xvi. Hand Positions.**

A doubled stick is required somewhere in the first three sixteenths of the right hand in Annotation xvii (Figure 5.131) in order to prepare the B and G for mallets 4 and 3 respectively. The D and C were chosen for the doubling in order to give mallet 4 more time to lift for the B. While this is not strictly necessary (there are plenty of locations where the sticks must lift more quickly), all other factors being equal, the extra lifting time is slightly comforting for the player. The double stops in the right hand are not as awkward as they appear and they are, fortunately, accompanied by an entirely static left hand. The ritard (used by most players at the final

cadence) will assist in the double stops, but if it is omitted (or only used on the repeat), the double stops may be played comfortably at full speed.



**Figure 5.131: Bach's Prelude in C Minor. Annotation xvii.**

The first count of the left hand begins with a springing position, so mallet 2 should be lifted in preparation for beginning the next pairing (of F and Eb). The second count of the left hand, while static under mallet 2, should be used to expand the interval between the mallets in preparation for the tenth that must be played on the third count.

The passage of Annotation i (for the left hand) consists of three hand positions (seen in Figure 5.135). Position 1 is played with the elbow out to the left of the mallet heads, pivoting inwards while playing the F on mallet 2. The second position is flat going into the third position, but the elbow pivots back to its original orientation on the first note of position 3. The initial tempo must be carefully selected for this piece, as the exposition is quite easy and may be played quickly, but the second half of the fugue becomes much more intricate and will require a slow tempo to have been set during these first few measures.

## 5.5 J. S. Bach's Fugue in C Minor (*The Well-Tempered Clavier* Book II)

**Fugue in C Minor**  
from the *Well-Tempered Clavier* Book II

J. S. Bach/Thomas Zirkle

The image shows the first page of the musical score for J. S. Bach's Fugue in C Minor. The score is written for a single melodic line on a treble clef staff in C minor (three flats) and common time. The first measure contains a whole rest. The second measure begins the fugue with a half note C4, followed by eighth notes D4, E4, F4, G4, A4, B4, and C5. A red box labeled 'i.' is placed under the first note. The third measure continues with eighth notes B4, A4, G4, F4, E4, D4, and C4. A red box labeled 'ii.' is placed above the first note. The fourth measure contains eighth notes B4, A4, G4, F4, E4, D4, and C4. A red box labeled 'iii.' is placed under the last note. Above the staff, a sequence of fingerings is provided: '4 3 4 4 3 4 3 4 3 4 3 4 3 4 3' for the first measure, '4 3' for the second, '3 4 3 4 3' for the third, and '3 4 3 4 3' for the fourth. The page is annotated with a red line and three red boxes labeled 'i.', 'ii.', and 'iii.'.

**Figure 5.132:** Page 1 of Bach's Fugue in C Minor (*The Well-Tempered Clavier* Book II)  
Annotation Map.

vi.cont.

vii.

viii.

ix.

x.

xii.

xiii.

xi.

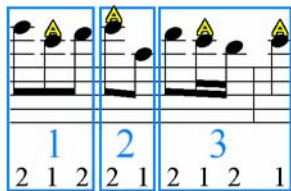
xiv.

xv.

**Figure 5.133: Page 2 of Bach's Fugue in C Minor (*The Well-Tempered Clavier* Book II) Annotation Map.**



**Figure 5.134: Bach's Fugue in C Minor. Annotation i.**



**Figure 5.135: Bach's Fugue in C Minor. Annotation i. Hand positions.**

The first measure of the left hand in Annotation ii (Figure 5.136) uses sticking sequences that allow the elbow to stay to the left of the mallet heads. Mallet 1 plays exclusively on the black bars and mallet 2 plays all of the white bars for the first measure. The sticking of the right hand must complement the choices of the left hand in that the body will be in the wrong position to play any right-angled pairs. These sixteenth notes in the right hand at the end of the first measure (of the annotation) are a good example of a passage that might be played with a right-angled pair if the left hand's constrictions were not present. The sixteenth notes are played, in this transcription, with the mallets reversed (with respect to the right-angled choice) and use a negative interval to keep the elbow to the left of the mallet heads.

In the second measure of Annotation ii (Figure 5.136), the left hand uses a springing position to play the sixteenth notes at the end of the measure. The springing position is often a good alternation option when the eye needs to move very soon after a group of notes. For instance, if the opposite sticking (2,1,2) were used for these three notes (D,C,B), the shift in the left hand would occur at the end of the three notes (between the C and B). It is slightly more efficient to utilize a springing position to shift between the earlier pair of notes (D and C) in



order to give the eye a bit more time to move up to the Eb in the right hand. The earlier shift does not interfere at all with the right hand's quarter note F, and the springing position has the added benefit of "dovetailing" smoothly into an alternating line. Note that, with the exception of a single double stick in the first few notes of each hand, this entire annotation uses nothing but alternating sticks.



**Figure 5.136: Bach's Fugue in C Minor. Annotation ii.**



**Figure 5.137: Bach's Fugue in C Minor. Annotation iii.**

If Annotation iii (Figure 5.137) were to be played by two hands, an experienced player would recognize immediately that it should be begun with the left hand. As the passage progressed, the player would find that the leading left hand encountered no obstacles in its smooth alternation. No doubled sticks and no awkward crosses (although the first D does present a gentle negative-interval cross) are encountered throughout the passage—this author always feels a wave of good fortune when encountering a passage of this nature. Once a player has played the scalar exercises of Chapter 4 long enough to gain some comfort with them, this

hand.



**Figure 5.138: Bach's Fugue in C Minor. Annotation iv.**

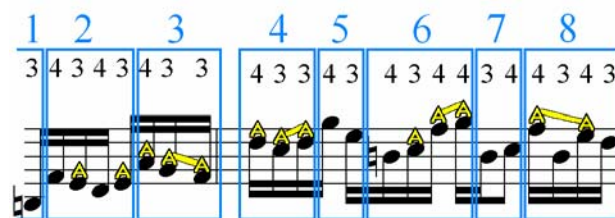
compared to the sticking sequence of a single flam accent.

mallets.

Figure 5.140) to give the player a strategy for tackling this difficult passage.



**Figure 5.139: Bach's Fugue in C Minor. Annotation v.**



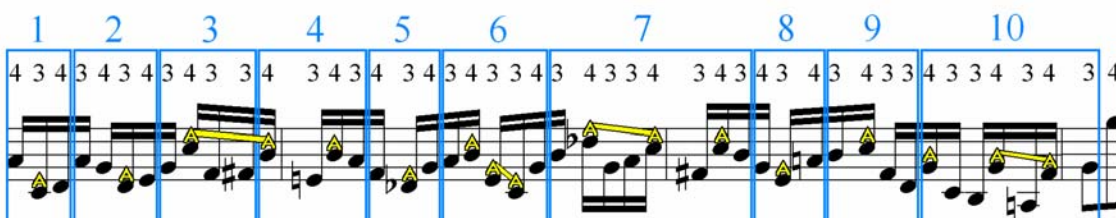
**Figure 5.140: Bach's Fugue in C Minor. Annotation v. Performance devices and hand positions.**

Position 1 is the completion of Annotation iv and connects easily with position 2, which proceeds normally with a negative interval and another easy connection to position 3. Position 3 is a bit more complicated with an anchor transfer from the Ab to the G, and a slide from the G to the F on mallet 3 that will connect with mallet 4 on the first note of position 4. Position 4, although the slide moves in the opposite direction, is virtually identical to position 3. Position 5 is a simple dyadic position, but prepares a rare kind of transition to position 6. The Eb (mallet 3) to B (mallet 4) connection is somewhat awkward, but the alternating sticks allow mallet 4 to be lifted well before the B and moving the elbow to the left will minimize the impact of the negative diminished fourth interval. The use of mallet 4 on the B also allows position 6 to be a springing position (and a paradiddle, as well). Positions 6 and 7 overlap in a similar way to that of positions 4 and 5. Position 8 uses a non-consecutive application of the sliding anchor technique.



**Figure 5.141: Bach's Fugue in C Minor. Annotation vi.**

Annotation vi, at three measures long, uses ten hand positions (see Figure 5.142). If the reader is daunted by the complexity of the positions, he may take comfort that this is about as difficult as it ever gets. As Annotation iii and Annotation iv showed the effects of good fortune, Annotation v and Annotation vi demonstrate the flip-side of the coin. That this is the worst of the piece should comfort the player—because this passage (although difficult) is manageable.



**Figure 5.142: Bach's Fugue in C Minor. Annotation vi. Performance devices and hand positions.**

Position 1 (see Figure 5.142) is a standard position seen many times in these annotations, but the connection to position 2 is not so typical. The D to Ab negative interval may be considered as completely ending position 1 on the D, and resetting for a springing position on the Ab of position 2. Note that springing from the Ab does not affect the choice of anchor in position 2 in any way—the Ab connects to the subsequent note (the G) then either the G or the D may be chosen as the anchor, depending on the surrounding circumstances. The transition to position 3 is an ascending arpeggiation—although the player may never have actually practiced a

C minor 9 arpeggio with the D on the bottom (D,Eb,G,C), the standard arpeggio studies of Chapter 4 should suffice to prepare the hands for this chord-like ascending connection. Position 3 consists of a paradiddle with a non-consecutive sliding-anchor connection to position 4, which is a relatively simple position with another arpeggiated connection (this time a, more familiar, descending Bb minor 7<sup>th</sup> chord) to position 5. Position 5 is a simple three-note position with a scalar connection to position 6. Position 6 transfers the anchor from mallet 4 to mallet 3, then slides the anchor down to the C, finishing with an arpeggiated connection to position 7. It is interesting to note that the repeated notes in positions 3, 7, 9 and 10 are not considered as sliding because they are not anchors. Although they feel a bit like the sliding anchors, they should each, technically, be determined by their interval from the anchor. Position 7 is one of the more stable positions of the entire annotation using a non-consecutive sliding anchor with five non-anchor notes connected to them. An arpeggiated connection to position 8 concludes position 7. Position 8 is another relatively easy position, this time with a scalar connection to the paradiddling position 9. Position 9's connection to position 10 is vaguely rudimental, but there are no actual rudiments that fit it (consecutive right-handed ruffs might be considered). The connection might also (perhaps more esoterically) be conceived as a sticking palindrome centering on the first mallet 4 of position 10. In the immediate area, this concept could be used as a connection, but the palindrome actually extends in both directions until the end of the annotation is reached.

Annotation vii (Figure 5.143) contains the simultaneous occurrence of a paradiddle, a sliding anchor, and a negative interval. The first two notes form a simple position, then mallet 4 begins a second position by playing the Bb (as if it were going to continue down a scale) and sliding down to the A. During mallet 4's slide, mallet 3 lifts normally to prepare for its Bb (negative interval) following the slide. This point begins a new position (on a G) with mallet 4.



**Figure 5.143: Bach's Fugue in C Minor. Annotation vii.**



**Figure 5.144: Bach's Fugue in C Minor. Annotation viii.**

As this fugue progresses there are an increasing number of double stops, and from this point to the end the piece is cluttered with them. The added notes make the transcriber's job easier because they, themselves, have no sticking options, and their presence often limits sticking options in the surrounding notes. The C in the right hand of Annotation viii was originally transcribed by this author for mallet 3. It seemed inevitable that as the two double stops moved to the right, the Bb,C,Db progression in mallet 3 would be the smoothest connection. This solution was never satisfactory, as mallet 3 had a long inter-manual journey from black bar to white bar then back to black bar. When mallet 4 was eventually considered, it was discovered that, even though there was a slight interruption in the flow of the hand to the right (mallet 4 must play D,C,E in this sticking), it is far less inconvenient than the inter-manual disruption.

The final solution has the added benefit of allowing the two mallets to stay in their original left-angled orientation for both double stops and the note between.

The doubled stick in the left hand is, contrary to normal practice, placed within the fast sixteenth notes instead of over the eighth note A. The reason for this break from procedure is that if the left hand shifts from mallet 2 on the eighth note A to mallet 2 on the next D, then the eye must verify that D while the right hand is playing a scalar line in sixteenth notes a sixth above. Moving the position change into the sixteenth notes in the left hand (from the G to the A, as it is in the transcription) allows the left hand to be firmly set before the A/D position is played—the eye's resources may then be assigned, completely, to the right hand.



**Figure 5.145: Bach's Fugue in C Minor. Annotation ix.**

Annotation ix is an example of how a single double stop can have a tremendous detrimental effect on the alternation of surrounding notes. Mallet 4 is forced to play four notes in a row and even the cause of the doubled mallet 3 (from G to Eb) may be traced back to the double stop. The only redeeming quality of the repeating mallet 4 (and it is not terribly significant) is the fact that it allows mallet 3 plenty of time to lift for the double stop.



**Figure 5.146: Bach's Fugue in C Minor. Annotation x.**

This short passage is another demonstration of the usefulness of the springing position. There are other options here: 1,2,1 pulls the hand out of position for the subsequent wide intervals; 2,2,2 is possible, but feels heavy; and 1,2,2, which works well, does have the advantage (over the springing position) of giving mallet 1 an extra sixteenth note to expand into the upcoming wide interval. Even though 1,2,2 has a slight time advantage over the springing interval, the extra time is superfluous and the more elegant 2,1,2 was chosen as a final solution.



**Figure 5.147: Bach's Fugue in C Minor. Annotation xi.**

This springing interval proceeds directly into a double stop. Reversing the sticks, in this instance, would have an interesting, but detrimental effect on the logistics of the passage. Consider the first position, with mallet 2 on the G and mallet 1 on the F: as time passes, the G plays, the F plays, and only then, mallet 1 may make its long, but very fast, journey down a fourth to the C (while mallet 2 simultaneously moves to the Eb). When the springing position is used, the flow is improved: mallet 1 plays the G, with mallet 2 lifted in preparation for the F. Mallet 1, on its rebound from the G, may move freely toward the C while the F is being struck by mallet 2. Mallet 2 then needs make only a short journey down one step to the Eb while mallet 1 has extraneous time to verify its location before striking with the Eb.



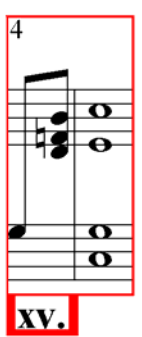


pairing are left-angled. If the tempo was faster, or the orientations had to change from left- to right-angle, the passage might be impossible and the transcriber would need to intervene with an editorial decision. Old-fashioned repetition and slow practice will suffice to gain mastery over this one large leap.



**Figure 5.150: Bach's Fugue in C Minor. Annotation xiv.**

While Annotation xiv is similar to Annotation xiii in its use of thirty-second notes, the thirty-second notes are no longer entangled in the troublesome double stops. The leap is also absent from this example. The thirty-second notes in this annotation are simply a springing position moving from a white bar to two black bars.



**Figure 5.151: Bach's Fugue in C Minor. Annotation xv.**

The penultimate chord, in Bach's *clavier* version, has a G between the upper two voices and another on the bottom line of the bass clef. The lower G is easy to omit because it does not exist on the "low A" marimba. Repeating the fourth space G might be an option, but it is needed for the final chord and playing it three times in a row seems to drastically change the character of

the cadence. Bach's text requires six fingers to play the final chord. This transcriber has decided to pare the voicing down to four (an easy decision to make) and to allow the G at the beginning of this annotation to ring through as the root for the entire dominant chord. The full-sounding Do, Sol, Me, Do voicing has been used for the final chord, as it sounds the best resolution of the modified dominant chord (though, unfortunately, this voicing bears little resemblance to Bach's six-note voicing).

## Chapter 6: Conclusions

There is a delicate balance to be achieved between the desire to give new ideas time to develop and the wish not to be perceived as trying to be “more Catholic than the pope.” Some of the techniques of this study have proven themselves in the (hopefully objective) opinion of the author to be positively worthy of inclusion into a modern marimbist’s arsenal. Included in this category are:

1. The concept of the anchor and its resultant positions.
2. Alternation sticking and pairing sequences for most linear parts of a single hand.
3. Negative intervals (in ideal settings) and springing positions.
4. The transferred anchor concept—in assistance of the kinesthetic sense for positions without the benefit of visual attention.

Other techniques, however, are still in the hypothesis stage. This author has had enough success with these techniques to believe that they warrant further study, but they have not yet attained a level of comfort sufficient for use in some performance situations. Techniques in this category include:

1. The one-handed roll from normal playing position (as described in Chapter 4).
2. Negative intervals (in non-ideal settings).

With regard to transcriptions, future research could include an annotated edition of all fifteen of Bach’s inventions, selected sinfonie, and selected preludes and fugues from *The Well Tempered Clavier* books. The keyboard works of other composers (W. A. Mozart or Domenico Scarlatti, for instance) might also be adapted for the marimba using the principles of this study.

Possible future research topics include the writing of method books on some of the tangential topics of this study. The use of rudiments in the training of individual hands on the marimba, for instance, could be expanded into a complete study. A large set of original etudes with performance annotations similar to those of Chapter 5 could help to bridge the gap between

never-having-used narrow-interval techniques and jumping directly into the Bach inventions. A sight-reading method book along the lines of Béla Bartók's *Mikrokosmos*, utilizing the principles of alternation sticking and positional theory to help overcome the kinesthetic difficulties of reading on keyboard percussion instruments might be of interest to some players.

It is sincerely hoped by this author that, in the spirit of scientific inquiry, other marimbists will replicate and expand on the research of this study—as this study has attempted to replicate and expand on the ideas of Burritt, Sammut, and Stevens—who were expanding on the ideas of Musser et al. While certain players may dispute the effectiveness of this or that technique, opening a debate about the possibilities of alternation sticking and a positional approach to technique are the intended outcome of this study. As with the debate over the benefits of different grips, discussion breeds many points of view, and some of these points of view will, hopefully, assist future marimbists to better control their mallets.

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## Appendix I: Glossary of Original Terms

**Alternation Sticking:** The technique of alternating the mallets of a single hand in the performance of independent linear parts

**Anchor (Non-anchor):** The anchor is the key note of one hand's position. Anchors are generally played by one specific mallet and when the anchor changes the position also changes (excepting transferred positions).

**Black Bar(s):** The bars of the marimba that correspond to the black keys of a piano. Sometimes called the “accidental” bars—although C natural, C flat, and D double flat are accidentals that fall on white bars.

**Chained Anchor:** See “Transferred Anchor.”

**Complex Position:** A hand position consisting of more than two different notes, at least one of which is an anchor. Transferred anchor positions are, by definition, complex, but non-transferred positions may also qualify as complex if more than one non-anchor note is used. Sometimes this term may refer to the joining of two simpler positions by means of a transferred anchor.

**Flat Position:** A hand position consisting of (usually) two notes. Both notes fall on the same manual—two black bars or two white bars.

**Hand Position:** A mental grouping of notes in aid of technique. Positions usually consist of an anchor note and one or more other notes that may be determined by their intervals from the anchor. Hand positions are conceived to provide a technical framework for the lateral motion of the arms required by four-mallet playing.

**Hard Angle:** See “Right-angled Position.”

**Inter-manual:** Literally motion between the manuals. This term is used infrequently, but it generally refers to arm motion in the z-axis (When lateral arm motion is x-axis and the stroke takes place in the y-axis.)

**Kinesthetic Sense:** The kinesthetic sense has been described as a true sixth sense. As percussionists the sense of time, however, must surely be the sixth sense, so maybe kinesthetic comes in at number seven. Kinesthetic sense is the knowledge of the position of parts of the body without using touch or sight. On the marimba this sense is usually combined with a mental picture of the keyboard to allow the player to play confidently on notes that are not verified by the eyes.

**Lateral Arm Motion:** Right-to-left, or side-to-side motion of the arms.

**Left-angled Position:** See “Right angled Position.”

**Manuals:** A term taken from the organ. On the marimba it refers to the black bars and white bars as separate structures.

**Narrow-interval Playing:** Technique using the mallets of one hand at a second interval. The ability to perform this technique is the *sine qua non* of alternation sticking.

**Negative Interval:** Created when a non-anchor mallet crosses the anchor bar to create an interval on the opposite side. The negative second is, by far, the most common negative interval.

**Pairing Sequences:** Sequences of the orientations of note pairings in a given scale or melodic pattern.

**Pairings (Note Pairings):** Created when the notes of a (usually) diatonic scale are divided into pairs for the purposes of alternation sticking. The position for each pair will fall into one of three orientations: Left-angled, Right-angled, or Flat.

**Positional Playing:** The technical application of discreet groups of notes that require little, or no, lateral arm motion. In this study, the term generally refers to the positions resulting from the application of alternation sticking to a given passage. Positions consist of an anchor note and other note(s) that are described by their intervallic relationship to the anchor.

**Repetition Sticking:** Sticking rationale that prefers the use of a single mallet for linear parts in one hand.

**Right-angled Position:** Usually a two note position containing one white and one black bar—named for the direction the wrist and elbow must move to play the pair (this results in the name equating with the relative position of the black bar). Hard angles require a very pronounced angle from the wrist (for instance, the right-angled pair E# and F in the right hand). Soft angles, conversely, require only a gentle angle from the wrist (for instance, the left-angled pair: Eb and F).

**Simple Position:** A hand position using only two notes and no negative intervals. Scalar passages consist of many successive simple positions.

**Sliding Anchor:** See “Transferred Anchor.”

**Soft Angle:** See “Right-angled Position.”

**Springing Position:** A position that begins with a negative interval (before the anchor).

**Transferred Anchor:** The transferred anchor is a technique for combining simple(r) positions by transferring the anchor from one bar to another. When the anchor

changes to a different mallet, the transfer is said to be “Chained.” When the new anchor is played by the same mallet as the old anchor, the transfer is said to be “Sliding.”

**White Bar(s):** The bars of the marimba that correspond to the white keys of a piano. Sometimes called the “natural” bars.



Musical score for "Author's Precedential Behavior" Page 2, measures 13-19. The score is written for piano in 5/4 time. It features complex rhythmic patterns, including triplets and sixteenth notes, and dynamic markings such as *a Tempo* and *p*. The score includes fingerings and articulation marks.

Measure 13: Treble clef, 5/4 time. Bass clef, 5/4 time. Fingerings: 2 1 2 1, 2 1 2 1, 2 1 2 1, 2 1 2 1.

Measure 14: Treble clef, 5/4 time. Bass clef, 5/4 time. Fingerings: 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1.

Measure 15: Treble clef, 5/4 time. Bass clef, 5/4 time. Fingerings: 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1.

Measure 16: Treble clef, 5/4 time. Bass clef, 5/4 time. Fingerings: 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2.

Measure 17: Treble clef, 5/4 time. Bass clef, 5/4 time. Fingerings: 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2.

Measure 18: Treble clef, 5/4 time. Bass clef, 5/4 time. Fingerings: 4 1 3 2 4 1 3 2 4 1 3 2 4 1 3 2.

Measure 19: Treble clef, 5/4 time. Bass clef, 5/4 time. Fingerings: 4 1 3 2 4 1 3 2 4 1 3 2 4 1 3 2.

Figure Ap.II. 2: Author's *Precedential Behavior*. Page 2.



# Do Bats Eat Cats?

Thomas Zirkle

**Figure Ap.II. 4: Author's *Do Bats Eat Cats?*. Page 1.**

The musical score is written for piano and consists of five systems of music. Each system has a treble and bass staff joined by a brace. The key signature is one sharp (F#). The score includes various time signatures: 3/4, 2/4, 6/16, and common time (C). Fingerings are indicated by numbers 1-4 above or below notes. Dynamic markings include *p* (piano), *mp* (mezzo-piano), and *p* (piano). The score is numbered 14, 17, 20, 23, and 26 at the beginning of each system.

**System 1 (Measures 14-17):** Treble staff starts with a 3/4 time signature, then changes to 2/4 and 6/16. Bass staff starts with a 3/4 time signature, then changes to 2/4 and 6/16. Dynamics: *p*, *p*, *mp*. Fingerings: 4 3 4 3 4 3 4 3 4 3 4 3, 4 3 4 3 4 3 4 3, 4 3 4 3 4 3.

**System 2 (Measures 17-20):** Treble staff starts with a 3/4 time signature, then changes to 6/16. Bass staff starts with a 3/4 time signature, then changes to 6/16. Dynamics: *p*, *p*, *mp*. Fingerings: 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3, 1 2 1 2 1 2 1 2, 1 2 1 2 1, 1 2 1 2 1 2.

**System 3 (Measures 20-23):** Treble staff starts with a 6/16 time signature, then changes to 3/4 and 2/4. Bass staff starts with a 6/16 time signature, then changes to 3/4 and 2/4. Dynamics: *p*, *p*, *mp*. Fingerings: 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3, 1 2 1 2 1 2, 1 2 1 2 1 2 1 2 1 2 1 2, 1 2 1 2 1.

**System 4 (Measures 23-26):** Treble staff starts with a 3/4 time signature, then changes to common time. Bass staff starts with a 3/4 time signature, then changes to common time. Dynamics: *p*, *p*, *mp*. Fingerings: 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3, 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2.

**System 5 (Measures 26-29):** Treble staff starts with a common time signature, then changes to 3/4. Bass staff starts with a common time signature, then changes to 3/4. Dynamics: *p*, *p*, *mp*. Fingerings: 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3, 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2.

Figure Ap.II. 5: Author's *Do Bats Eat Cats?*. Page 2.





# Two Part Invention in F Major

Transcribed for 5-Octave Marimba

J. S. Bach/ trans. Thomas Zirkle

3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 4 3 4 3

1 2 1 2 1 \_ 1 2 1 2 1 2 1 2 1 2

3 4 3 4 ...

1 2 2 1 2 1 1 2 1 2 ...

3 3 4 3 4 3 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4

1 1 2 1 2 1 1 2 1 2 1 2 1 2 1 2 1 2 1 2

3 4 3 4 3 4 3 4 3 4 3 4 4

1 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1

Figure Ap.II. 7: Bach's *Two Part Invention in F Major*; Page 1.



3 3 4 3 4 3 3 4 3 4 3 4 3 4 3 4

1 1 2 1 2 1

3 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3

1 2 1 2 1 2 1 2 1 2 1 1 2 1 2 1 2 1 2 1 2

3 4 3 4 3 4 4 3 2

1 2 1 1 2 1 2 1 2 1 1

**Figure Ap.II. 9: Bach's *Two Part Invention in F Major*; Page 3.**

**Appendix II.4: Bach's *Two Part Invention in E Major* [Begins on following page.]**

# Two Part Invention in E Major

J. S. Bach/ trans. Thomas Zirkle

Transcribed for 5-Octave Marimba

The musical score is presented in five systems, each with a treble and bass staff. Fingerings are indicated by numbers 1, 2, 3, and 4 above the notes. The key signature is E major (three sharps: F#, C#, G#) and the time signature is 3/8.

**System 1:** Treble staff starts with a whole rest, followed by a half note G#4, a quarter note A4, and a half note B4. Bass staff starts with a whole rest, followed by a half note E3, a quarter note F#3, and a half note G#3. Fingerings: Treble (4, 3, 4, 3, 4, 3, 4, 3, 3, 4, 3, 4, 3, 4, 4, 3, 4, 3, 4); Bass (1, 2, 1, 2, 1, 2, 1, 2, 1, 2, 1, 2, 1, 2, 1, 2, 1, 2).

**System 2:** Treble staff starts with a half note A4, a quarter note B4, and a half note C#5. Bass staff starts with a half note F#3, a quarter note G#3, and a half note A3. Fingerings: Treble (1, 2, 1, 2, 1, 2, 1, 2, 1, 2, 1, 2, 1, 2, 1, 2, 1, 2); Bass (3, 4, 3, 4, 3, 4, 3, 4, 3, 4, 3, 4, 3, 4, 3, 4, 3, 4).

**System 3:** Treble staff starts with a half note B4, a quarter note C#5, and a half note D5. Bass staff starts with a half note A3, a quarter note B3, and a half note C#4. Fingerings: Treble (1, 2, 1, 2, 1, 2, 1, 2, 1, 2, 1, 2, 1, 2, 1, 2, 1, 2); Bass (1, 2, 1, 2, 1, 2, 1, 2, 1, 2, 1, 2, 1, 2, 1, 2, 1, 2).

**System 4:** Treble staff starts with a half note C#5, a quarter note D5, and a half note E5. Bass staff starts with a half note B3, a quarter note C#4, and a half note D4. Fingerings: Treble (1, 2, 1, 2, 1, 2, 1, 2, 1, 2, 1, 2, 1, 2, 1, 2, 1, 2); Bass (1, 2, 1, 2, 1, 2, 1, 2, 1, 2, 1, 2, 1, 2, 1, 2, 1, 2).

**System 5:** Treble staff starts with a half note D5, a quarter note E5, and a half note F#5. Bass staff starts with a half note C#4, a quarter note D4, and a half note E4. Fingerings: Treble (1, 2, 1, 2, 1, 2, 1, 2, 1, 2, 1, 2, 1, 2, 1, 2, 1, 2); Bass (1, 2, 1, 2, 1, 2, 1, 2, 1, 2, 1, 2, 1, 2, 1, 2, 1, 2).

Figure Ap.II. 10: Bach's *Two Part Invention in E Major*; Page 1.

3 4 3    4 3    3 4    3 4 3 4 4 3 4 3    4    3 4 3 4 3    4 3 4 3    4 4 3 4    4 3 4 4 3

26    26

2 1 2    1 2 1 2 1    2    1    1    1    2    1    1    2

4 3    4 3 4    3 4 3    4    3 4 3    4    3 4 3    4    3 4 3    4    3 4 3    4    3 4 3    4    4 3 4    4

31    31

1    1    2    1    2    1    2    1    2    1    2    1    2    1    2

4 3 4 3    4 3 4 3    4 4 3 4    3 4 3 4    3 4    4 3 4    4 3 4 3    4 3 4 3    4    4 3 4    4 3 4 3    4

36    36

1    1    2    1    2    1    2    2    1    2    2    1    2    1    2

3 4 3 4    3 4    4 3 4 3    3    4    3    4    2/1    3    4    3    4    3    4    3    4

41    41

2    1    2    1    1    2 1    2    1    2    1    2    1    2    1    2 1

4    4 3 4 4 3    4 4    3 4    3    4    3    4    3    4    3    4    3    4    3    4    3    4

46    46

2 2 1 2 2 1 2 1 2    1    2    1    2    1    2    1    2 1 2 1    2    2 1 2 2 1

Figure Ap.II. 11: Bach’s *Two Part Invention in E Major*; Page 2.

3 4 3 4 3 4 3 4 3 4 3 4 3

51 51

1 2 1 1 2 1 2 1 2 2 1 2 1 2 1 1

4 3 4 3 4 3 4/3 (4) 3 4 3 4 3 4 3 4 3 4 4 3

56 56

2 1 2 1 2 1 1 2 1 2 2 1 2 1 2 1 2 1 2

4 4 3 4 4 3 4 4 3 4 3 4 3 2 1 2

61 61

1 2 1 2 1 2 1

Figure Ap.II. 12: *Bach's Two Part Invention in E Major*; Page 3.

Appendix II.5: *Bach's Two Part Invention in B Flat Major* [Begins on following page.]

## Two Part Invention in Bb Major

J. S. Bach/Thomas Zirkle

Transcribed for 5-Octave Marimba

The image displays a page of musical notation for a piano piece, consisting of three systems of staves. Each system includes a treble staff and a bass staff, with various musical notations such as notes, rests, and fingerings. The notation is written in a key signature of two flats (B-flat and E-flat) and a common time signature (C). The first system shows a complex melodic line in the treble staff and a more rhythmic bass line. The second system continues the melodic development in the treble and adds more complex rhythmic patterns in the bass. The third system features a more active bass line and a melodic line in the treble. Fingerings are indicated by numbers 1 through 5 above or below the notes. The overall style is that of a classical piano score, likely from a 19th or 20th-century composer.

**Figure Ap.II. 13: Bach's *Two Part Invention in Bb Major*; Page 1.**







Appendix II.6: Bach's Prelude in C Minor (*The Well-Tempered Clavier Book II*).

# Prelude in C Minor

from the Well-Tempered Clavier Book II

J. S. Bach/Thomas Zirkle

The image displays the first page of a musical score for J.S. Bach's Prelude in C Minor from The Well-Tempered Clavier Book II. The score is written for piano and consists of four systems of music. Each system includes a treble and bass staff joined by a brace. The key signature is C minor (three flats). The time signature is common time (C). Fingerings are indicated by numbers 1-4 above or below notes. Articulations, including slurs and accents, are present throughout. The first system covers measures 1-4, the second measures 5-8, the third measures 9-12, and the fourth measures 13-16. The piece concludes with a repeat sign and a final cadence in measure 16.

Figure Ap.II. 16: Bach's Prelude in C Minor (*The Well-Tempered Clavier Book II*);  
Page 1.



# Fugue in C Minor

J. S. Bach/Thomas Zirkle

**Figure Ap.II. 18: Bach's Fugue in C Minor (*The Well-Tempered Clavier* Book II); Page 1.**

3 4 3 4 4 3 4 4 3    4 3 4    3 4 3 4 3 4 3    4    4 3 4 3    4    3    4    3    4    3    3

2    2    1    2       2    1    1/2    1    1/2    2    1/2    1/2    1    1/2    1    2    1    2    1    2    1    2    1    2    1    2    1

3    4 4 3    3 4    4       4 3 4 3    4       4    3    3 4 4 3 3 4       3 4

2 1 2    1 2    1    2       1    2       2 1    1    2       1 2    1 2    1    2       1 2    1    2    2       2    2    1 2    1 2    2

4 3 4 3 3 4    3 4 3 4 3 4 4    3 4       3    4    3 4 3 4 3 4    3 4    4    4    3 3 4 3 4 3 3    4 4 3    3 4 3 4    3

2       2       1 2    1 2    2 1 2       1 2       2 1    2       2    1    1

4 3 4    3 4    3    4 3 4    4 3       3       3       3       3       3       4    3

1    2       1 2          2    1 2          2    1 2       2    1 2       2    1 2

3 4                   3 4    3 4    3    4 3 4    3 4    3 4

2       2       2 1 2 1    2

Figure Ap.II. 19: Bach's Fugue in C Minor (*The Well-Tempered Clavier* Book II);  
Page 2.

## **Vita**

Thomas Zirkle was born in 1968 in Anderson, Indiana. Zirkle began studying percussion at the age of 10 and in his late teens was torn between the study of music or mathematics education—music won. His bachelor's degree was in music education from Ball State University in 1993, and his Master of Music degree followed two years later from Southern Illinois University.

Zirkle served proudly as a Combat Medical Specialist with the United States Army Reserve and earned the rank of Sergeant (and a handful of service medals and awards) in Saudi Arabia during Operation Desert Storm. Further travels have taken him to Southeast Asia, where he and his wife, Wee Le Khin lived for over three years (in her native Singapore and Malaysia). His work in Asia with an educational software developer trained him in the creation of multimedia CD-ROM's—experience he intends to use in the development of educational training tools for high school- and college-aged percussionists.

Zirkle spends his recreational time practicing, composing, reading (particularly Victorian and American fiction), and kick-boxing (he is a member of the Go-Ti School of Fighters). He is also a volunteer tutor for the Literacy Volunteers of America.