

The application of the teaching methods of Opher Brayer¹ in the compositions of jazz pianist Yaron Herman.

**Developing a portfolio of original compositions based
upon these concepts.**

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Abstract

Yaron Herman is a talented and influential Israeli-born jazz musician, currently residing in Paris. At the age of 31, he has released six albums, the first when he was 21. What is more remarkable is that he only started learning the piano at the age of 16 (following a sports injury that curtailed his basketball career dreams), under the tutelage of Opher Brayer, who used a combination of philosophy, mathematics and psychology. The intent of this research is to firstly, identify and understand the key concepts of Brayer's methods as applied by Yaron Herman, and secondly, develop a portfolio of compositions utilising these principles. A recital of these tunes will then be presented.

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Introduction

Many books and resources have been published on the 'nuts and bolts' of jazz technique: harmony, melodic concepts, modes and scales, patterns and riffs, chord voicings. However, there appears to be little discourse on the psychological aspects of improvising – 'letting go'; connecting emotionally with the music; overcoming fears, laziness, mental blocks (the inner 'critic'). While publications already exist that attempt to deal with this, such as Kenny Werner's *Effortless Mastery*, there does not appear to be a balanced methodology that encompasses both psychological issues and the practical, 'spontaneous compositional' demands of improvisation.

Opher Brayer's approach seems to address some of the practical aspects of improvisation and composition, by incorporating a musical system developed by Joseph Schillinger in the early 1940s, based on mathematics. This system (upon which the Berklee College of Music was founded) develops potential for creative forms and expression by exploring various permutations – options for composition or improvisation that are not readily explained by traditional music theory. Critics of the Schillinger system argue that it is too complex and counter-intuitive for the average jazz musician. Opher Brayer has obviously taken aspects of this system that are more relevant for the jazz musician in general, and Yaron Herman in particular, and achieved a balance that has enabled Herman to progress rapidly as a pianist, and, importantly, develop a 'voice' in the jazz genre.

Part 1: The fundamentals of the Schillinger System of Composition.

While the scope of Joseph Schillinger's techniques are very broad, covering a wide range of compositional outcomes, this exegesis will discuss the fundamentals of Schillinger techniques especially in regards to how they relate to Opher Brayer's teaching style, and in particular, Yaron Herman's development. The presentation of the following techniques are not a mere restatement of Schillinger's ideas, but an attempt to make the fundamentals more easily understood, in light of contemporary idioms, as well as focusing on those concepts that are relevant to the research topic.

Joseph Schillinger (1 September 1895 – 23 March 1943) was a Ukraine-born composer, teacher and music-theorist who moved to New York in the 1930s. In this time, he was highly regarded as an advisor to many musicians and composers of the time, notably George Gershwin, Benny Goodman, Glenn Miller, Oscar Levant, John Cage and Earl Brown. Schillinger was interested in jazz particularly due to its rhythmic structure, and founded the first Russian Jazz Orchestra. He applied his theories to try to explain the basis of swing, and it was his lecture in Moscow in 1929 on 'The Jazz band and music of the future' that was the reason for him needing to leave the Soviet Union. (Schillinger, 1976). Gershwin spent four years studying with Schillinger, during this time composing 'Porgy and Bess' and consulting with Schillinger on aspects such as orchestration. (Duke, 1947). Glenn Miller also composed 'Moonlight Serenade' as an exercise for his teacher (Schillinger, 1976).

The complete *Schillinger System of Musical Composition* was written as a four-year course that was taught in private lessons. During the 1940s, Schillinger-certified teachers spread throughout the US and developed more than 40 schools under his name. Berklee founder Lawrence Berk was trained by Schillinger and established Schillinger House in Boston. Later he renamed it Berklee College of Music. "My appreciation of the Schillinger System knows no bounds. It constitutes my formal musical education almost in its entirety,"

attested the late Bill Leavitt, Berklee's first Guitar Department chair. (DiTullio, 2009).

Schillinger's system was an attempt to create a definitive study on the relationship of numbers to music and a way to free up composers from traditional compositional constructs. However he was very clear not to create a stylistic idiom with his system: *"My system does not circumscribe the composer's freedom, but merely points out the way to arrive at a decision. Any decision which results in a harmonic relation is fully acceptable. We are opposed only to vagueness and haphazard speculation."* (Schillinger, 1946, p. 1356) The basic philosophy of the Schillinger approach is to help solve musical problems with the mathematical approach addressing many of the limitations of conventional music theory.

Permutations

At the heart of the Schillinger system is the concept of permutations. These can be of note pitches, rhythmic elements, melodic phrases, intervals, and scales. In terms of the influence on Yaron Herman, these techniques are the ones that have been the most beneficial to him, from his own account (Herman, Three Note Symphony: Yaron Herman at TEDxHelvetia, 2012). In Part 3 of this thesis, analysis of Herman's compositions reveals further details of application. However a smaller number of these techniques have immediate significance to improvisation, as can be seen below.

There are two main types of permutations used to create musical variations, which are termed 'General Permutations' and 'Circular Permutations'. General Permutations reveal all possible combinations of elements in a group, while Circular Permutations deal with rotation or re-ordering of all elements of a group, and thus produce more limited variation².

For example, three elements are selected (A,B,C), which could be pitches or rhythm durations, and the variations that could be derived from these elements are determined. In the general method the following results are obtained:

² Circular Permutations keep the same sequential structure of elements but rotate them clockwise or anti clockwise e.g. ABC, CAB, BCA.

ABC BAC ACB BCA CAB CBA

In other words, six possible permutations of the three elements (mathematically determined by the factorial of 6, or $6! = 1 \times 2 \times 3$). If these were pitches, the variations could be as follows:



Fig. 1.1

If instead, each element were rhythm durations, a possible group of variations would be these:



Fig. 1.2

And of course, the note and rhythm variations could be combined:



Fig. 1.3

Once further elements are added, the number of permutations increases rapidly. For example a group of four (ABCD) would yield 24 variations (ABCD, ACDB, ADBC, ACBD, ADCB, BCDA etc). Five elements gives 120 variations, Six – 720, Seven – 5,040, and so on. At just ten elements, already there are 3,628,800 variations. Therefore when working with general permutations, less than five elements should be used, otherwise the numbers get too large and difficult to handle. Larger numbers of elements *can* be used, as long as constraints on permutations are included, such as Fig 1.4 demonstrating five notes and a reasonably repetitive rhythm pattern with the first note kept constant.

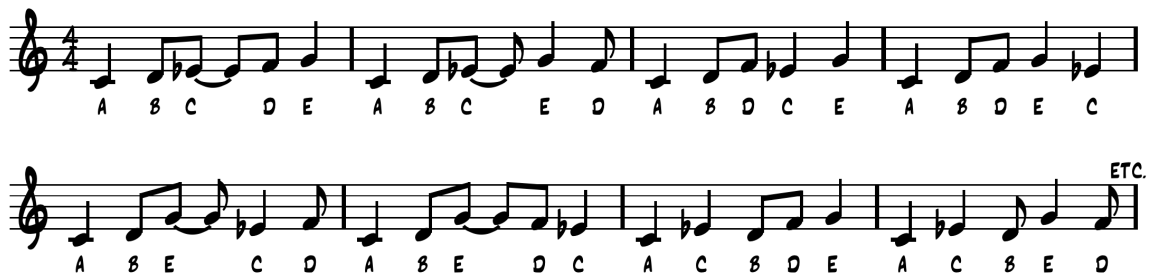


Fig. 1.4

For the improviser, the application of this technique should be immediately apparent and relevant to the concept of ‘sequencing’ in solos. That is, where an idea (rhythmic and/or melodic) is repeated and transformed in a number of different ways such as permutations (as displayed), and motivic development (inversion, retrograde, augmentation, modulation etc). So in the representation of the Schillinger concept, a fixed group of notes could be repeated and given rhythmic variation, or a rhythm pattern could be used to explore different note choices.

For the composer, initially at least, this idea could appear too methodical and thus restrictive (which has been an argument used by critics of the Schillinger system (Schillinger, 1946, pp. ix-x)). However it can be an important method for overcoming ‘writer’s block’, and forcing the composer to explore options that are not merely intuitive or familiar, thus providing possibilities for inspiration and creative flow in a hitherto unexplored direction.

“The strength of the Schillinger System rests on the foundation of permutations that offer infinite possibilities. The system changes the composing paradigm from “What do I write next?” to “What do I choose from the seemingly endless possibilities?” The sheer number of choices can easily overwhelm the composer. In order to solve this problem, Schillinger instructed his students to choose a limited number of techniques or permutations for each piece they wrote. He called this a “song manifold,” and it’s the guiding force to limit musical choices.” (DiTullio, 2009).

It should also be mentioned at this stage, that one's intent and commitment to an idea is what brings this out of the purely mechanical realm. Yaron Herman: *"An important part is emotion – when you make music it's about expressing emotion, it's about connecting to the choices you make. The goal I would try and impose on myself was when I choose something to play, I must commit to it – I must give content, context, intention, dynamics to whatever I play. So if I start very simple, 1-2-3 (C, D, Eb), I listen to what I'm actually playing, then find what I feel right now."* (Herman, Three Note Symphony: Yaron Herman at TEDxHelvetia, 2012)

'Circular Permutations' are more useful than General Permutations to expand upon a musical idea and discover the potential therein. For example, take a four-bar rhythmic pattern for a melodic phrase and construct three different grouping possibilities of bars within that phrase.

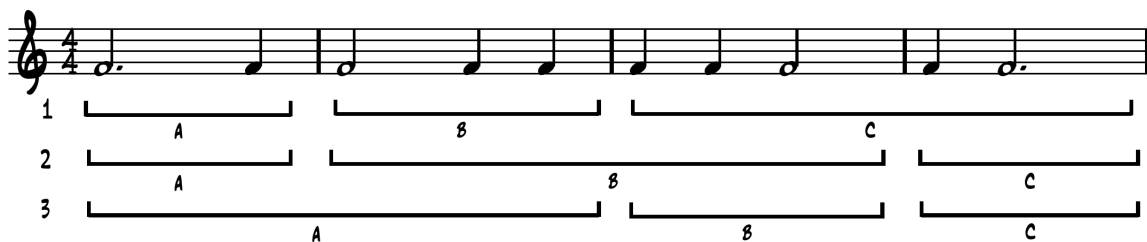


Fig. 1.5

The letters ABC are applied to each element and then the elements are rotated (transformed) in a clockwise direction: ABC, BCA, CAB.

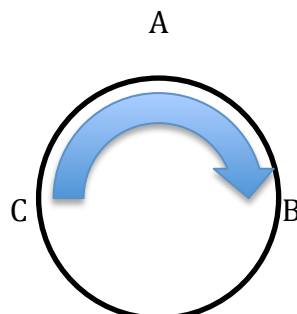


Fig 1.6

Alternatively, a counter-clockwise direction could be used with the variants then being: ACB, CBA, BAC. It should be clearly seen that a 12-bar (or 16-bar if the original version is used at the beginning and end) melodic phrase can be successfully obtained from this method, which would then demonstrate a clear form with a sound structural sense.

These permutation methods are one facet of the Schillinger system, but a key one that will be seen in my original works as well as Yaron Herman's compositions. Another fundamental aspect of Schillinger's ideas is that of his *Theory Of Rhythm*, which will be presented in summary here. This theory is the first book in the Schillinger System Of Musical Composition (Schillinger, 1946) and is foundational to Schillinger's work. He applies these techniques to all areas of his writings on music.

Pulse Interference

The primary premise of Schillinger's Theory Of Rhythm is that a rhythm occurs when two separate 'pulses' are combined, with the pulses both originating from the same point, but having differing frequencies. The superimposition of these pulses produces 'interferences' and thus rhythmic patterns. In the following graphical representations, each change in level of the square wave represents a new note.

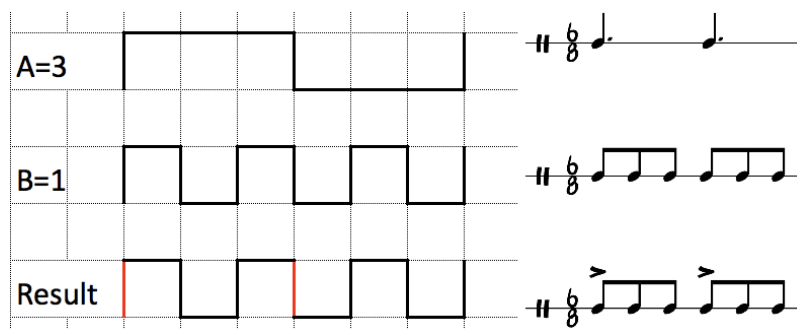


Fig 1.7

In Fig. 1.7, a rhythm of 3 beats (A) is combined with a rhythm of 1 beat (B). The unit of rhythm in these examples is arbitrarily $1/8^{\text{th}}$ note ($t=1/8$) but could be any

duration. The resultant rhythm features a stronger pulse (highlighted in red), which could be interpreted as a down beat or bar-line (if $t=1/4$). This is what Schillinger defines as meter and only occurs where A is an integer multiple of B ($A/B=n$ where $n=2,3,4\dots$ etc).

Most interesting and varied rhythmic patterns occur when A and B possess no common divisor other than 1, so that complex rhythms result.

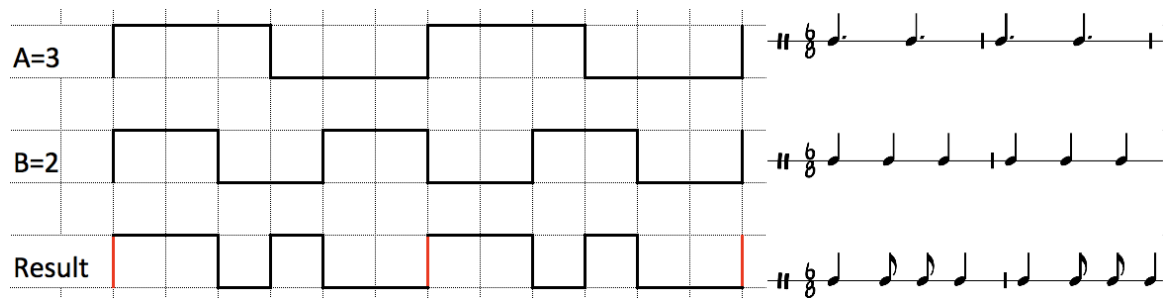


Fig 1.8

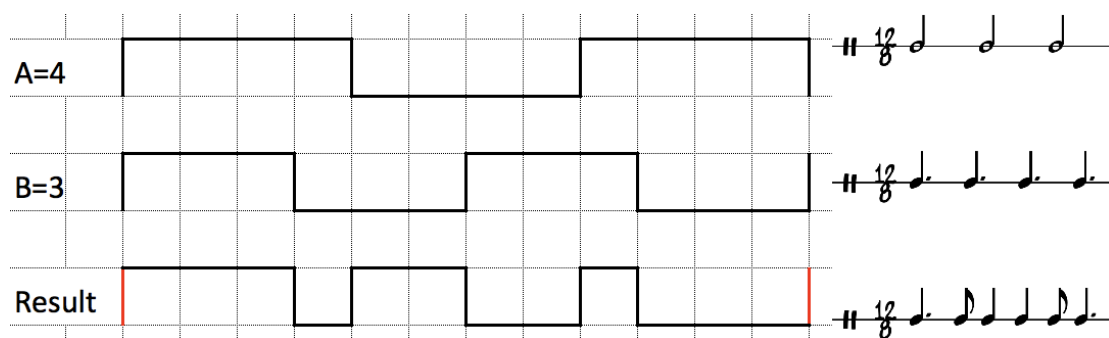


Fig 1.9

The resultant rhythms in Figs 1.8 and 1.9 can be expressed as numerical groups, so for a rhythm of 3:2 the grouping of durations is: (2,1,1,2), and 4:3 is (3,1,2,2,1,3). Rhythms generated in this way are repetitive and symmetrical³, and therefore demonstrate musical qualities of *economy* and *balance*, according to Schillinger. A further quality of *contrast* refers to the difference between generated number values, therefore the greater the difference, the greater the contrast.

³ Symmetry here refers to mirror or palindromic symmetry around the centre of the number patterns.

It should be apparent that this approach is another method of determining the rhythmic cell that is generated by a polyrhythm, but Schillinger uses the subsequent rhythm pattern as a melodic rhythm, and as such could be used over varied meters and with different note durations. In fact, no mention is made to the actual durations of each beat of the rhythm, and so inclusion of rests in addition to, or instead of, notes are to the composer's discretion and taste. For example, Fig 1.10 demonstrates various groupings and barring of the rhythmic combination of 3:2 (2,1,1,2).



Fig 1.10

To create even more variety in terms of generated number patterns, Schillinger proposes a second method which is accomplished by squaring the larger rhythm of the combination (e.g. for 3:2, $3^2=9$). This gives a combined rhythm sequence duration of 9 beats, with the second rhythm (in this case 2) starting on successive beats of the first rhythm.

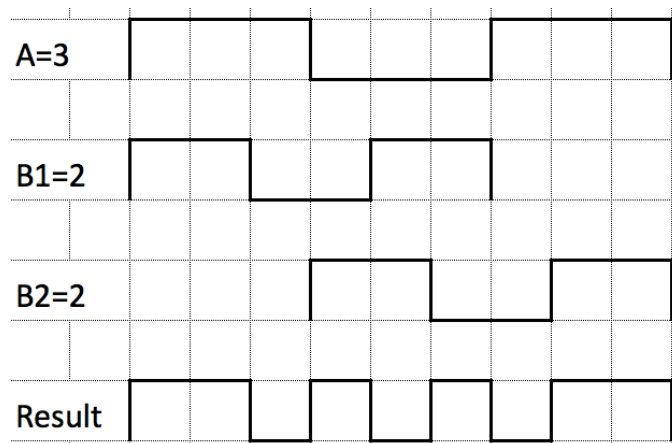


Fig 1.11

In this case, the numeric result is (2,1,1,1,1,1,2) which is similar to the first method (2,1,1,2). If the rhythm of 4:3 is used, the result is (3,1,2,1,1,1,1,2,1,3), compared with the previous (3,1,2,2,1,3). The second method becomes interesting when used with meters that correspond to the B rhythm (e.g 2 in this

case, although 4/4 is also available). In Fig. 1.12, notice the implied 3/4 rhythm in bars 4 & 5, creating syncopation in otherwise a fairly static rhythm.



Fig 1.12

Motivic syncopation and displacement can occur when these patterns are applied to a melodic grouping of notes. If, for example, four pitches of notes are chosen (C, D, E, F), and the rhythm pattern of 3:2 is used, therefore from the first method, the resultant would be (2,1,1,2). It should be obvious that if the time pulse is an $\frac{1}{8}^{\text{th}}$ note ($t=\frac{1}{8}$), then this pattern would fit nicely into a bar of $\frac{3}{4}$ (or $\frac{6}{8}$) without syncopation (Fig 1.13).



Fig 1.13

Taking the second method interference pattern, the resultant is (2,1,1,1,1,1,2). In this case, the pattern is now seven notes (with $t=\frac{1}{8}$), fitting in a bar of $\frac{9}{8}$ ($3^2=9$ See Fig 1.11), although as the distinct pitches are only four notes, a motivic displacement occurs, which takes 28 notes (or 7 rhythm notes x 4 pitches) to recur, i.e. 4 bars.

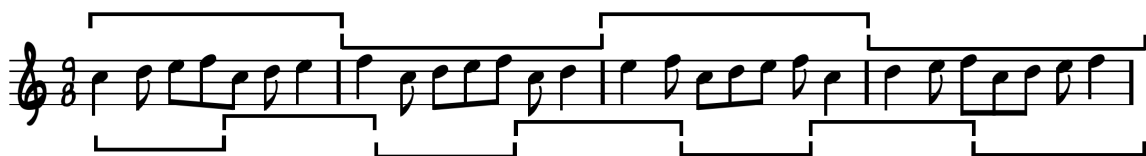


Fig 1.14

Implied polyrhythms utilising a motif such as this can prove to be an interesting and effective compositional technique, which will be seen in the compositional analyses in Parts 3 and 4 of this thesis.

Rhythmic groupings can also be applied to harmonic rhythm, with the resultant interference patterns being applied to chord durations. Fig 1.15 demonstrates possible examples using 3:2 (2,1,1,2), with t being either 1/8th or 1/4 note duration.



Fig 1.15

While these methods may be applied to create melodic rhythms that have symmetry and could prove useful in arrangement (for example with 3:2, the chordal rhythms could follow the individual 3 and 2 patterns as above, while the melody follows the resultant combined rhythm), the second method quickly becomes quite complex as squaring the larger number can result in a lengthy rhythm (e.g. 5²=25). The other criticism of especially the second method, is that number combinations which don't produce polyrhythms (i.e. numbers that share a common divisor in addition to 1, such as 4:2, 6:3 etc), are irrelevant as the resultant rhythm patterns are just 2222 or 333333. This is why Schillinger suggests using more than just two number generators. Once again, though, large numbers can quickly be reached which is why Schillinger suggests limiting the exercise to numbers less than 9. Fig 1.16 shows a table listing common first and second interference patterns up to 7:6 to demonstrate the extensive number patterns from two number generators.

Rhythm grouping	First method interference pattern	Second method interference pattern
3:2	2112	2111112
4:3	312213	3121111213
5:2	221122	2211111111111111122
5:3	3213123	32121111111112123
5:4	41322314	4131121211314
6:4	42244224	422222222222224
6:5	5142332415	5141131221311415

terminology, these subgroups of the original meter are called *factorial binomials*, while Jeremy Arden refers to them as *seeds*.

“A single bar of rhythm unfolds into a multi-layered score, somewhat like the development of the mature plant that grows from a tiny seed.” (Arden, *Keys To The Schillinger System*, 2006, p. 46)

This method can also ‘seed’ more than two elements:

$$(a+b+c)^2=(a^2+a.b+a.c)+(b.a+b^2+b.c)+(c.a+c.b+c^2)$$

So 4/4 meter could produce $(2+1+1)^2=(4+2+2)+(2+1+1)+(2+1+1)$

The rhythm of the 5/4 subgroup $(3+2)^2$:



Fig. 1.17

In a similar fashion, 4/4 meter could have a subgroup of $(3+1)^2 = 9+3+3+1$ which is interesting as now we have odd number groupings of beats within 4/4 time. In addition, when the larger number in the subgroup is listed first, the resultant grouping will always display durations that shorten, or accelerate as above, whereas the opposite or retrograde will have durations that lengthen or retard (e.g $(2+3)^2 = 4+6+6+9$). Furthermore, both these versions could be combined and a further rhythm yielded (Fig. 1.18).

$(3+2)^2$

$(2+3)^2$

Combined

Fig. 1.18

Taking this a step further, the *original* subgroup of 3+2 can be expanded in order to fit the 25 beats, and added to the score. The formula for expanding the subgroup is:

$$a(a+b)+b(a+b)$$

So for a=3 and b=2: $3(3+2)+2(3+2)=15+10$ which can be added as in Fig. 1.19, 4th staff down⁵.

Finally, the second interference pattern could be used (Fig. 1.11), although with just 3:2, this only gives 9 beats – so in order for it to work in context, the larger number must be identical to the time signature, in this case 5 and using the combination of 5:3. This can be added as shown in Fig. 1.19, bottom staff.

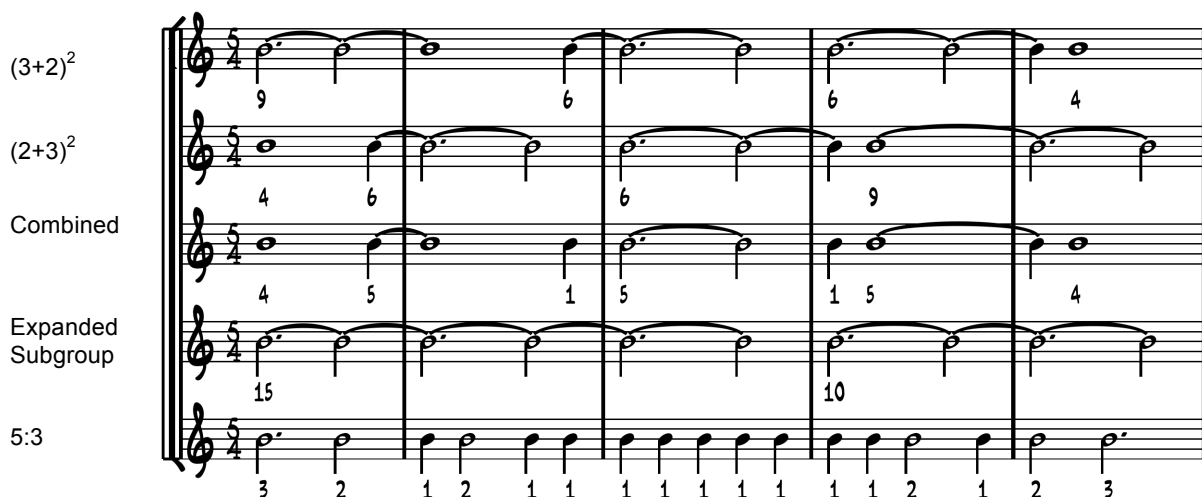


Fig. 1.19

As all the parts in Fig 1.19 are related to the time signature, there is a rhythmic ‘completeness’ to the structure. The structure could be scored for percussion, combo, orchestral arrangement etc. However, this really just illustrates the various possible patterns that could be generated by one subgroup – maybe only one or two patterns would be incorporated in a composition. It is also important to be creative with the patterns, for example: the rhythm could

⁵ The formula is essentially the same as $(a^2+a.b)+(b.a+b^2)$, but the presentation produces an alternate numeric combination or pattern.

become an ostinato bass line, driving the piece; one pattern could just be a chordal rhythm; the numbers could even represent musical intervals.

For the improviser, common time signatures and their patterns can easily be memorised and incorporated into rhythmic ideas (chordal or melodic). Notice that for purposes of establishing rhythmic variation, the elements of each subgroup need to be different to each other.

Meter	Subgroup (a+b)	Squared subgroup $a^2+a.b+b.a+b^2$	Expanded subgroup $a(a+b)+b(a+b)$
3/4	(2+1)	4+2+2+1	6+3
4/4	(3+1)	9+3+3+1	12+4
5/4	(3+2)	9+6+6+4	15+10
7/4	(4+3)	16+12+12+9	28+21
6/8	(4+2)	16+8+8+4	24+12

Fig 1.20

These patterns can also be played retrograde, and further contrast could be obtained by incorporating rhythms from meters different to the master time signature. The rhythm patterns do not need to strictly adhere to the unit of beat either – durations could be in terms of divisions or multiples of the 1/4 or 1/8th note.

Interference and squaring techniques applied to melodic forms

The interference patterns of various groups (e.g. 3:2, 5:4 etc) can be used to organise phrases of notes within a melody. Schillinger refers to these as ‘attack’ groups. For example, 7:6 would produce the pattern (6,1,5,2,4,3,3,4,2,5,1,6) utilising the first method (see Fig. 1.8). The result can also be paired: (6,1)(5,2)(4,3) and so on, which displays how the contrast within the pairs starts high, reduces and then returns to the original contrast. We have seen the balance produced by these patterns, but in a practical sense, sometimes

swapping the pair order makes a more musical phrase. In this example, the last pair could be swapped to (6,1) in order to complete the phrase on a longer note. This demonstrates the concept indicated by Schillinger in utilising techniques to assist in arriving at a musical result, rather than relying on strict adherence to 'rules': "*Any decision which results in a harmonic relation is fully acceptable.*" (Schillinger, 1946, p. 1356). Here is this in musical notation from Jeremy Arden (Arden, 1996, p. 74). The phrasing marks indicate the 'attack' groups:



Fig. 1.21

Durations of chords can be obtained by expanding techniques, so if the meter was 4/4, and the subgroup chosen was (2,1,1) then if the group is squared:

$$(2+1+1)^2=(4+2+2)+(2+1+1)+(2+1+1)$$

this could provide the melodic attack groupings. If the subgroup is expanded, then we get:

$$(2 \times 4)+(1 \times 4)+(1 \times 4)=(8+4+4)$$

which could provide the chord durations. This could rhythmically be represented by Fig 1.22, where the top line is the melodic rhythm from squaring the subgroup, and the bottom line could represent the chordal rhythm from expanding the subgroup. In this case $t=1/16$ note.



Fig. 1.22

Theory Of Pitch Scales

The previous discussion has been entirely focused on Book 1 of the Schillinger System, *Theory Of Rhythm* and is the foundation upon which the rest of the system is developed in terms of harmony, structure etc. It is also the book that seems to have had the most relevance in modern teaching, not just with Yaron Herman, but with other Schillinger educators such as Jeremy Arden (Arden, *Keys To The Schillinger System*, 2006), and Phillip DiTullio (DiTullio, 2009).

The second book is titled *Theory Of Pitch Scales*, and will be discussed here as it demonstrates the application of techniques in the first book, to scale derivation and melodic permutations. Schillinger begins by defining and permutating one-unit scales, up to four-unit scales (units representing pitches). For example, three-unit scales consist of two intervals which could be represented by 55 combinations: 1+1, 2+1, 3+1 up to 10+1; 1+2, 2+2, 3+2 etc.

For example:

C, C#, D = 1+1	C, C#, D# = 1+2
C, D, Eb = 2+1	C, D, E = 2+2
C, D#, E = 3+1	C, Eb, F = 2+2
C, A#, B = 10+1	C, A, B = 9+2

The pitch permutations of the three notes would be $3!=6$ and these can be further combined into sequences of melodic form and then a time rhythm can be superimposed on the melody. The permutations can therefore quickly get quite large. What seems to be more interesting, and possibly more musical, is to use circular permutations.

As an example, if the notes C, D and F are chosen, using circular permutations the possibilities are:

C D F, D F C, F C D (clockwise)
C F D, F D C, D C F (counter-clockwise)



Fig 1.23

Combinations of these permutations could be added together and a rhythm pattern superimposed.

Melodic form: 3(group)A+1(group)B+2(group)C, superimposed rhythm of 4:3 (3,1,2,2,1,3) and time signature of 3/4:



Fig 1.24

This technique of modifying a melodic ‘cell’ can produce variations of a theme or motivic development, which can be applied both to composition and improvisation. For the latter, the system has more application in terms of initial practice techniques of a motif, scale, riff, and exploring the various musical permutations, thus developing a familiarisation with permutations. This ability can then be practically brought in to an improvisation context, as exploration of an idea. Schillinger presents an example from Gershwin (the refrain of *The Man I Love*) as an illustration of this compositional technique (Schillinger, 1946, p. 111).

Schillinger presents tables of pitch scales up to four units only, as these are, in conventional terminology, tetrachords, which can be combined to form traditional seven note major and minor scales. If two tetrachords are combined, separated by the interval of 2, all major and minor scales can be produced.

The tetrachords are:

Major (M) = 2+2+1 (e.g. C, D, E, F)

Minor 1 (m_1) = 2+1+2 (e.g. C, D, Eb, F)

Minor 2 (m_2) = 1+2+2 (e.g. C, Db, Eb, F)

plus the Eastern tetrachord:

Harmonic (h) = 1+3+1 (e.g. C, Db, E, F)

Therefore a major scale is $M+2+M$, a natural minor is m_1+2+m_1 , harmonic minor m_1+2+h , and so on. Schillinger suggests that, in his terminology, 'ecclesiastic' modes are derived from the major scale. However, this system can also describe these modes, with occasional displacement of the '2' interval. For example, Lydian would be $2+M+M$.

This concept of pitch scales becomes more interesting when generated interference rhythms from Book 1 are applied to pitch intervals. For example, the pulse interference pattern of 4:3 (3,1,2,2,1,3) could be applied to determine scale intervals, thus producing the scale in Fig 1.25.

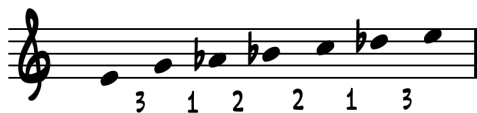


Fig 1.25

Similarly, either the time signature or a pre-determined numerical pitch range (e.g. 5 = perfect 4th) could be sub-divided to produce a scale or note selection. For example, $5=3+2$ or $2+3$, which could produce (from C) either C, Eb and F, or C, D, F. With the interference group derived from $(3+2)$ against $(2+3) = 2,1,2$, further note patterns could be produced from the combinations:

$2+1+2=$ C, D, Eb, F

$2+2+1=$ C, D, E, F

$1+2+2=$ C, Db, Eb, F

5 could also be divided into $4+1$ and $1+4$, producing:

$1+3+1=$ C, Db, E, F

$1+1+3=$ C, Db, D, F

$3+1+1=$ C, Eb, E, F

Therefore any interval range could be sub-divided into binomial, trinomial, quintinomial⁶, and expanded to produce scales of increasing complexity. An example would be to take an octave (12) and divide it into various combinations

⁶ The interference pattern of three-number (trinomial) groups and permutations results in five-number groups (quintinomial).

such as 7+5. The interference pattern of 7+5 and 5+7 gives 5,2,5, resulting in combinations of 5+2+5, 5+5+2, 2+5+5.

These trinomials produce quintinomial permutations of:

2+3+2+3+2

3+2+3+2+2

2+3+2+2+3

3+2+2+3+2

2+2+3+2+3

Fig 1.26 displays the various permutations in the key of C

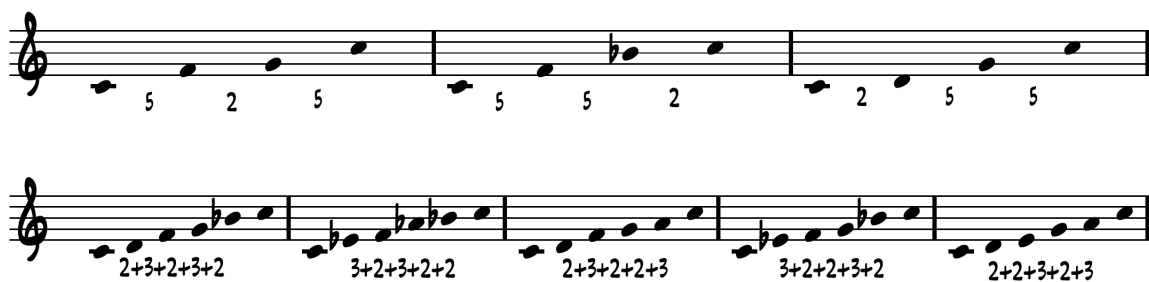


Fig 1.26

Furthermore these permutations could be expanded to nine terms, such as:

2+1+1+1+2+1+1+1+2= C, D, Eb, E, F, G, Ab, A, Bb, C

and the number terms could also be combined into nine different arrangements.

The objective of using these pitch scale terms, according to Schillinger, is that a simple scale or even interval, could evolve into scales of increasing complexity, but that they all belong to one family and thus can produce continuity within melodic forms. This can be seen in Fig 1.26 as all the scales are from major, minor or dominant (interestingly, the major 7th degree is not available). Similarly a melodic cell could evolve into a more complex theme, in terms of another section or subject.

Another method for producing melodic development is through the system of circular permutations of the individual pitch units of a scale. Basically the system takes a scale (for example, a major pentatonic), and rotates it so that each variation now begins on successive notes of the scale (Fig 1.27)



Fig 1.27

This is immediately recognisable as the method for generating modes of a parent scale, by taking each successive note and examining the structure of the scale as a new mode. By transposing each variation to the original tonic of C, the following variations are obtained.



Fig 1.28

These variations can each be given circular permutation treatment, to produce more melodic variants.⁷

An intriguing application is in the fact that rhythm interference patterns, sub-groupings etc, can all be applied to pitch intervals. In practical terms, for the improviser, this approach is an alternative to the standard scale-harmony relationship, although being derived mathematically from an original mode or harmony, still maintains a sense of belonging or family. In the same way that a standard pentatonic scale may be used in improvisation as a way of playing 'outside' the harmony due to the inherent 'strength' of the scale construct, pitch-scales derived by the above techniques provide greater degrees of experimentation and alternate 'modes' that can be explored in improvisation.

⁷ The idea of circular permutations, and variations of pitch-scales is a method used extensively by the jazz composer and educator, Jerry Bergonzi, in his popular publication series *Inside Improvisation*. Immediate comparisons can be seen between his examples and the examples given here, in *Volume 2: Pentatonics* (Bergonzi, 1993), as an initial reference.

The remainder of Schillinger's Book 2, *Theory Of Pitch Scales*, contains some interesting concepts and techniques, especially scale expansion (upper structures in modern terminology) as useful tools for thematic development.

Geometrical Inversions

Book 3: *Variations Of Music By Means Of Geometrical Projection* deals with melodic motivic developmental techniques that are familiar to musicians, such as inversion, retrograde, retrograde inversion and so on. Schillinger expands on this technique to include chord structures, specifically the inversion of chord forms. This is an interesting way of expanding and creating different chord progressions, which, due to their geometric relationships, could be used as variations within an existing melodic structure, or utilised as completely new chord progressions.

The technique calls upon the inversion of intervals within a chord, but rather than merely inverting the relative intervals (e.g a major triad consists of a major 3rd plus a minor 3rd (4+3), which inverts to a minor triad (3+4)), the chord is inverted from a *pitch axis*. The process is more clearly seen in the following example whereby a C major triad inverts to an F minor triad from the pitch axis of C. This illustrates another example of the importance of symmetry within Schillinger's methods.

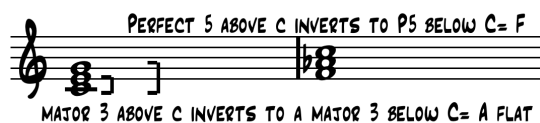


Fig 1.29

Below is an adaptation of a table by Schillinger of some standard chords and their geometric inversions underneath, using C as the pitch axis.

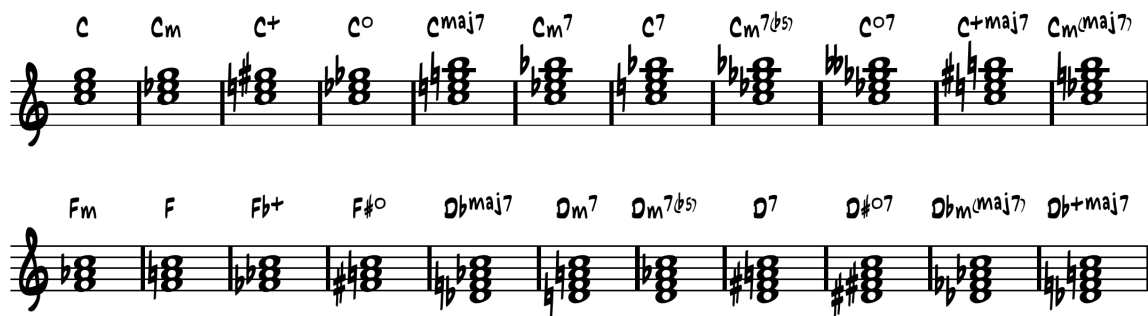


Fig 1.30

It should be readily seen that chord inversions and extensions also determine different geometric outcomes. Because of this, application to jazz composition would be limited, unless specific chord voicings are notated (although a chart such as Fig 1.30 could be drawn upon as substitutes for standard chord types). Composers and arrangers of Big Band scores could therefore make use of this technique. Schillinger gives an example of both a melody and harmony which have been geometrically inverted and refers to these 'inversions' as *psychological reciprocals* or *contrasts*, due to the fact that they're related to the original chords by means different to a purely scalar derivation. This process has been applied to a section from an original composition around the pitch axis of G, demonstrated in Fig 1.31. For this exercise, the chords have been notated in root position.



Fig 1.31

The top line indicates the original melody and harmony with the bottom line portraying the *psychological reciprocals* of both melody and harmony. The inverted form actually makes musical and harmonic sense, and could be utilised as a variation on the theme. In Part 4, the composition will be analysed in detail demonstrating an aspect of this technique that was used in the final piece.⁸

Jeremy Arden (Arden, 1996, p. 33) takes the concept another step into generating a chord progression from the original, inverted, retrograde, and retrograde-inverted chords, and determines a path through all of these to arrive at a new progression. Fig 1.32 demonstrates this with the original chords of Fig 1.31.

The diagram consists of four staves of musical notation, each representing a different transformation of the original material. The first staff is labeled 'ORIGINAL' and shows a sequence of chords in 3/4 time. The second staff, 'INVERTED', shows the original chords inverted. The third staff, 'RETROGRADE', shows the inverted chords in reverse order. The fourth staff, 'RETROGRADE INVERTED', shows the retrograded chords inverted. Arrows indicate a path from the original to the inverted, then to the retrograde, and finally to the retrograde inverted.

Fig 1.32

The choice of direction and chords through the above is purely arbitrary, but is one method of generating new progressions via geometrical means. (Sibelius software also automates the retrograde process). The resultant chord progression is shown below and could form the basis for another section, or even an entirely new composition.

⁸ While the actual process of finding reciprocals could be quite time-consuming, *Sibelius* notation software has the ability to do this for the composer. A plug-in called 'Invert', under 'Transformations' can perform this operation around any pitch axis. This makes the prospect of utilising this in practical compositions much more appealing to the composer.



Fig 1.33

Once again, while the theory and mathematical approach can take some getting accustomed to, the results are musical, and the techniques are useful tools in obtaining harmonic and melodic variations which otherwise may not have been approached from the composer's normal frame of reference. The most important point is that these results, while entirely adequate, should *inspire* new exploration in the process of composing, and not be necessarily seen as an end in themselves. (Schillinger, 1946, p. 1376)

One further topic will be examined from the books, which has already been touched upon in some previous examples. This is from Book 6: *The Correlation Of Melody And Harmony*, and is concerned with composing with 'melodic attack groups', not just as melodies, but also achieving balance with harmonic rhythm.

Rhythms and melody produced by attack groups

Attack groups are groups of melodic pitches which could be grouped per chord duration, per bar, or per rhythmic pattern described previously. At its simplest form, a time signature could be expanded into its subgroups, which could then constitute attack groups. For example, 4/4 could be 3+1 or 1+3, or expanded further into 2+1+1, or a permutation thereof. Balance is a factor in using these groupings in a composition, so if 3+1 was used at the beginning of a melodic sequence, 1+3 would suit the end. Trinomials could also be used: 2+1+1 at the beginning, 1+2+1 in the middle, and 1+1+2 at the end. The terms can also be split to create more attacks, for example 1+1+1/2+1/2+1.

Schillinger uses A to indicate an attack group, and H to indicate a harmony or associated chord. An example used (Schillinger, 1946, p. 647), displays a seven-bar system in 4/4. The length of the system is determined (in this case), by

$$1a+2a+3a+5a+3a+2a+1a$$

where a=number of elements in a sub-group, and each attack group corresponds to one chord (H), with a Fibonacci⁹ sequence determining the attack group numbers (although the number sequence is deliberately constructed to maintain mirror symmetry). The example is thus:

$$4H+(3+1)H+(2+1+1)H+(1+1+\frac{1}{2}+\frac{1}{2}+1)H+(1+1+2)H+(1+3)H+4H$$

which could be represented by:



Fig 1.34

There is a high degree of symmetry and balance associated with this method, which, while accurate, is also somewhat predictable. What is much more interesting is using two rhythm groupings, one for the attack groups, and another for duration of the attacks. Taking the interference pattern produced by 5:4 as the attack groups (4,1,3,2,2,3,1,4), and the second method (see Fig. 1.11) interference pattern of 4:3 as note durations (3,1,2,1,1,1,2,1,3), the chord durations can be determined by the sum of the durations in each attack group. This is easier to comprehend from the table below, with the layout concept courtesy of Jeremy Arden (Arden, 1996).

⁹ Fibonacci sequence is a series of numbers where the first two numbers are 0 and 1, and each subsequent number is the sum of the previous two.

Attack Groups	4	1	3	2	2	3	1	4
Durations	3,1,2,1	1	1,1,2	1,3	3,1	2,1,1	1	1,2,1,3
Chord Durations	7	1	4	4	4	4	1	7

Fig 1.35

Rhythmically, this could be illustrated by Fig 1.36, where the bottom line indicates the harmony or chord duration. In this case the unit of duration is $1/8^{\text{th}}$ note (in other words, Fig 1.35 displays 4 bars of 8/8).



Fig 1.36

While still demonstrating a degree of symmetry, this usage of different rhythm groupings for attack groups and durations, provided a more musical and interesting result in application to an original composition. Once again the foundational rhythm ideas from Book 1: *Theory Of Rhythm*, are applied not just to melodic, but also harmonic rhythm. While initially the concepts and techniques can appear overwhelming (and possibly 'dry') with regard to the very algebraic approach used, there are many ideas that can be of assistance in composition and arranging, especially when confronted by so-called 'writer's block'. The potential contained in these concepts can be hugely beneficial in expanding creative pathways beyond the traditional and intuitive approaches.

The discussion of Schillinger's techniques will conclude here, at least until Parts 3 and 4 of this thesis, where the compositions of Yaron Herman and original compositions will be analysed in depth. This section has only just scratched the surface of Schillinger's theories, but it has presented the fundamental concepts of Schillinger which are also carried over into his theories of melody and harmony. These are the foundational ideas that comprise some of the teaching

methodologies by Opher Brayer, and which find practical application in jazz composition/improvisation.

Part 2 will focus on the psychological and philosophical approaches incorporated by Brayer, and attempt to achieve an understanding of the combination of all these ideas in teaching and learning.

Part 2: The Connection: Psychological & Philosophical Approaches

Music can be described as a creative discipline, an art form. And as such it is often difficult to merely reduce into simple melodic, harmonic, rhythmic components and techniques. It involves emotion and expression, and while much music has that at its heart, improvisation is unique in that the performer must draw upon all those elements - structure and knowledge, emotion and spontaneity - in real-time. There must be a balance though – emotion cannot be communicated without a form or vehicle in which to convey it. Similarly, it could be argued that music devoid of emotion becomes noise and means nothing of consequence, having no lasting impact upon the listener.

While jazz education teaches students form, scales, harmony and many of the necessary ingredients for composition, real-time or otherwise, often there are not many skills imparted on how to ‘connect’ internally, to translate emotional thought into notes. One of the main reasons for that is time – students have a finite time with any particular tutor or course, and to develop skills for self-expression requires a mentor/mentee relationship; it requires time and empathy from the educator.

“Opher Brayer is a great motivator and mentor. In regards to psychological elements – he knew exactly where you were in terms of your personality and knew exactly where to push the right buttons to make you overcome your fear; overcome whatever was stopping you from becoming who you could become – psychologically and creatively. Which is not something we usually deal with in music school, we’re like: “there’s the knowledge, there’s the scale, this is what you can do with it. You can superimpose that on this chord, this chord and this chord”. But no-one goes like, “And who are you?” In terms of theory and piano technique, Opher Brayer gave me the tools to develop my own tools. He said, either you learn a language, or you learn how to learn languages. He gave me more of the way of thinking, the conceptual tools, and how to develop your own style - being really creative and thinking in a very methodical and creative way about whatever I did.” (Herman, 2012)

Some of the key philosophical approaches taught by Opher Brayer in terms of overcoming obstacles such as fear, are those of Gurdjieff and Ouspensky. Georges Ivanovitch Gurdjieff (1872-1949) was a Georgian philosopher, and one of the great philosophers on esotericism. Ouspensky was a student of his during World War I and the Russian Revolution, whose major writing *In Search of the Miraculous: Fragments of an Unknown Teaching* (Ouspensky, 2001) was predominately Ouspensky quoting Gurdjieff (Friedman, 2003). Interestingly, prominent jazz musician Keith Jarrett also studied Gurdjieff (Carr, 1992), and in fact released an album of music composed by Gurdjieff entitled *Gurdjieff: Sacred Hymns* (Gurdjieff, Gurdjieff: Sacred Hymns, 1980).

Gurdjieff's principles are centred around a notion entitled The Work, fundamental concepts for transforming one's self. However, in contrast to the prevalent pop-psychology of positive thinking as a way to improve one's life and circumstances, Gurdjieff recognised that while one *can* improve oneself, life always throws unexpected events and challenges, and it is not by ignoring or denying those challenges that the improvement occurs, but in *reacting* to them. A fundamental requirement for change and self-improvement is the desire and motivation to apply the ideas of The Work. This only comes from valuing them. *"When we begin to highly value the Work and therefore love it, the ideas of the Work enter our Emotional Center. The Emotional Center gives us the energy to apply the Work ideas rather than just be aware of them in our Intellectual Center."* (Friedman, 2003, p. 76).

Opher Brayer follows these principles in his teaching, not just in the ideas of psychological self-improvement, but also in terms of musical self-improvement:

"So what he aspired to, is to teach me how to create my own games, basically. My own rules, my own way of coming up with exercises. I had to find a way, since I was very determined and I really wanted it. I had to find a way of studying everything, and the stuff he didn't teach me, I had to learn by myself." (Herman, 2012).

Rather than merely impart knowledge and concepts, Opher Brayer's skills lay in inspiring and motivating students to discover them for themselves. Jazz pianist Bill Evans said exactly the same thing in his interview with his brother, Harry. *"If you give him (the student) too much, you take his motivation away because he hasn't discovered anything"* (The Universal Mind Of Bill Evans, 2005). Herman mentions that Brayer would often tantalisingly leave a book on the piano when he arrived for a lesson, only to announce, once Herman enquired about it, that it "was not for you. You are not ready for it yet" (Herman, 2012).

The Law Of Three

The Law Of Three is really the foundational principle of The Work, and simply put, states that every manifestation or event is the result of three forces. The first is the active force – or initiating force, the second is the passive or resisting force, and the third is the neutralising or connecting force. In the context of an everyday scenario, wanting a job because of unemployment is the active force, disliking the effort involved in finding a job is the passive force. Without a third force, nothing will happen or any efforts will be very limited. However with a third force such as overdue rent, no food etc, suddenly this force is the condition that makes one go and find a job. All three forces are necessary for an event to occur, and once the event has occurred, a new triad is formed, say now wanting to do well in the job, and this becomes the first force again.

The first force is what is wanted, the second resists or prevents that. According to Gurdjieff, until both active and passive forces are seen, it is impossible to see the neutralising force. However to be able to see and understand especially the second or resistive force, it is necessary to become non-critical self-observers – a process which does take time and training.

Applying the Law of Three to music and learning, the desire to play or improvise is the active force. The passive force could be fear – of mistakes or failure, not being 'good enough' or having enough technique (a self-comparison to others deemed better than oneself), or the physical act of performing in front of people.

The third or neutralising force could simply be the intense hunger for self-expression – that one *has* to give voice to what is inside; it can't be contained; an almost uncontrollable desire. However, the desire may not always seem to be there – or be quashed by the everyday realities of being a musician (the boring gigs, the uninterested audience etc.). One technique or shortcut to reduce the resisting force, according to Gurdjieff, is simply to 'will' what has to be done and do it with enthusiasm, giving it "everything you've got". Therein the resistive forces are greatly reduced. Musically this could be accomplished by intense focussing on one's playing, exploring the music, the harmony, the interaction; determining to play with all the emotion one has, regardless of external events.

This degree of engagement does take training, non-judgmental self-observation and self-acceptance. While the application of Gurdjieff's philosophies understandably requires a long-term learning and commitment, nevertheless there are sound practical aspects to self-observation and an objective recognition of resistances in regards to successful improvisation and composition.

Opher Brayer is said to have the ability to help students to observe and improve themselves as, according to Herman, he "knows how to push the right buttons to make you...overcome whatever was stopping you from becoming who you could become". These are hallmarks of a gifted and intuitive teacher, one who inspires their students to personal achievements. Where Brayer succeeds is that, in terms of The Work, he enables students to see their two parts: essence and personality. Essence is one's true being or nature, while Personality grows through external influences, learning and observation, and becomes core values and opinions. Personality is important as it gives strength to survive in the world, but it can dominate action and thus mask true nature. Brayer helps the student discover and nurture their essence, their deep calling, so that it is recognised as their passion and they end up doing what they love. This is possibly a large part of the reason why Yaron Herman progressed so quickly – that passion and intense desire became his motivation. His exploration of ideas

or pathways, and ability to express them were propelled as a result, and thus his global recognition as a unique 'voice' in jazz.

The challenge for the jazz educator is to effectively assist a student in finding and developing that passion. Techniques to facilitate the process have been explored in books such as Kenny Werner's *Effortless Mastery* which deals practically with methods to 'surrender the need to sound good', an obvious resistive force (Werner, 1996). More recently, jazz pianist Jean-Michel Pilc's book *It's About Music: The Art and Heart of Improvisation* (Pilc, 2012), explores techniques for identifying and strengthening the inner voice, and thus the creative flow. Some of these will be summarised below in light of teaching methodologies. One other essential resource for the improviser is *Free Play* by Stephen Nachmanovitch (Nachmanovitch, 1991). This book deals with creativity as a playful approach and deals in depth with the nature of improvisation, playfulness, the muse, and obstacles to creative freedom. Many of the principles in this volume have strong connections to Gurdjieff's Work, but expressed with a contemporary musical perspective and therefore possibly a more accessible and inspiring source for the music student. Brayer introduced Herman to this book, with the result that Herman has read it "about two hundred times!" (Herman, 2012)

Exercises

Exercises in Pilc's book are simple; achievable yet designed to help reduce resistive forces in a very practical manner. The first exercise is to do with the foundation of all music: rhythm. Rhythm has to be natural, internalised and as subconscious as a heartbeat – it must be felt, otherwise in any improvisational context, concern or awareness of rhythm will disrupt flow and energy. Pilc's exercise is a "tap and talk" action: tapping one's knee while talking – starting simply with name, date etc., moving on to things that require more effort and concentration. This ideally needs to be done with another person, so they can tell when tempo varies, when awkwardness in feel and rhythm occurs. Rhythms can then start to become more complex, imitating ride cymbal swing patterns for example. The simplicity of this exercise belies the effectiveness of it and there is

a feel of 'rightness' when independence and 'ownership' of the rhythm occurs. The exercise is developed to become rhythmic vocalisation of phrases, original or copied, but without concern for pitch.

A second exercise encourages a "one-man band" approach: shifting rhythm, melody and bass lines between different parts of the body. For example, tapping with hand or foot, playing a bass line with the hands, singing or humming a melody, and then swapping actions between limbs and voice. This exercise is designed to promote identification with other instruments and importantly, all aspects of a composition or performance, as well as disassociation or independence – to achieve once again, a flow or 'state of grace'; a deeper level of connection. Pilc then expands this exercise into melodies and second parts, in order to develop an awareness of polyphony and balance – in a similar way to what Schillinger's mathematical processes are designed to do. In fact, a practical way of internalising some of the mathematical concepts would be to apply them to these exercises, so that internalisation can occur with these as well. For example, taking a simple interference pattern of 3:2 or 2112 (Fig 1.16), one could sing, play or tap that rhythm over a 4/4 pulse, using the numbers as note durations and varying the duration between an 1/8th and 1/4 note. The pulse itself could be varied from 3/4, 2/4, 6/8 etc. This would be a very effective method of internalising some of the interference patterns, which might then translate into elements of the performer's improvisation.

Ideas such as singing melodies while accompanying oneself, singing melody ideas while just moving fingers on an instrument without playing, and then finally singing and playing together, are common techniques which are covered in other publications and teaching materials, yet are nonetheless crucial. Pilc takes this further however, in trying to assist the *source* of melodic inspiration. Interestingly, he suggests a way to do that is by recording and listening to one's playing. In recording a performance, one should make a conscious note of senses, memories, easy or awkward moments, and then after a day or two, listening to the recordings from a 'hearer' perspective rather than the 'player'.

The similarities of this process, and Gurdjieff's techniques of *non-judgmental self-observation* are not coincidental. "*According to The Work, the main requirement for self-observation is to separate into two people: the observed and the observer.*" (Friedman, 2003, p. 64). These observations become 'composite photographs' of how one thinks and acts in particular situations. This process must be objective – value is lost when one becomes overly self-critical, or conversely, self-justifying. And according to Gurdjieff, we should also not analyse why we do or act as we do. We just observe. Pilc suggests listening to a recording of oneself as a whole, like listening to the music of someone else.

"A good sign that the process is going well is that you will have more and more good surprises, instead of bad ones, when listening back to the recordings. As the distance between player and hearer diminishes, there is a lucidity, a developed perception which will, at the moment you are playing, send you all kinds of signals about the music being made, whereas previously you were so stuck in the playing mode, in the moment and in the circumstances that it was taking you away from the music and preventing you from hearing it and feeling it properly.

Also, by hearing and spotting in your recordings what you don't like, you develop antibodies to some elements of your playing which turn you off as a listener. So next time it happens and you are playing something similar – or even better, right before it happens again – you feel it and react to it (by cutting it short and going somewhere else for example). Until one day, these elements just disappear. Gil Evans used to call it "self-editing"." (Pilc, 2012, pp. 122-123).

Note that the reaction to the particular aspect that isn't favourable is simply a changing direction or thought, without a critical judgment attached. This is also the essence of The Work.

"So there is a "minus" process of elimination involved, but conversely you should also go through a "plus" process of familiarisation: by hearing and spotting what you do like in your recordings, you spontaneously perceive these elements as essential to your language, and naturally integrate them into it. When it comes to the meaning of your language, the familiarity of your voice

and the creation of your musical home, the importance of such a process can't be overstated." (Pilc, 2012, p. 123).

There are many more practical techniques outlined in Pilc's book, others of which have been successfully implemented in my own teaching methods. Many of these have ultimately similar goals of achieving self-observation and an ability to react to circumstances without judgment or self-criticism, keys to cultivating an internal 'connection', and giving voice to one's true essence. The methods highlighted here illustrate similarities to Gurdjieff principles as well as possible integration with Schillinger techniques.

The application of mathematics and philosophy is best highlighted by Herman: *"In terms of mathematical concepts, I found it hugely beneficial because I did not have to count on "inspiration" – whatever that means anymore. You know, one day it's there, the other day you have no ideas, another day you feel like you've discovered the world. And you're kind of dependent on destiny – the goodwill of goddess inspiration. And I didn't want that – I wanted to be able to produce music, ideas, harmony whenever I wanted to, or whenever I needed to. When you go on stage, you have to deliver – you're not like "I'm not feeling it today. I'll go back and walk around the block, maybe I'll come back. Oh no, can we postpone the concert?" You have to be on stage and it's 'on' and it has to be deep. So since I desired to be free, I realised that the only way I would be free was if I unleashed whatever was causing me to come back to the same place every time – what we call habits. Whatever we do, when we play a note, the other note is a choice, or the other chord after one chord, is a choice. I realised that mathematics was the only way where I would have infinite possibilities. And the closer you got to infinity, the closer you got to freedom. So basically if you know three chords, you're not free – you can just run three chords. If you know 3 million chords, you can just run 3 million. But then you have to train your brain to be able to present you those possibilities at any given moment, at any given musical crossroad. And that's a lot of work. By thinking in that 'combinations' way, that really freed everything. So when you start thinking mathematically, you have much greater freedom."* (Herman, 2012).

In Herman's case, the third or neutralising force in the Law of Three, is the use of mathematical possibilities – freeing one both from the constraints of not feeling in the “zone”, as well as reactive habits or mechanical behaviours in improvisation. The possibilities offered by techniques such as Schillinger, are less traditionally *vertical* or constrained by harmonic dictates, and more *horizontal* – opening up possibilities that may have more to do with permutations of notes or rhythms over time.

While Schillinger's concepts have more immediate applicability in light of compositional techniques explored in this thesis, by engaging with them in practice routines, such as previously described, an internalisation can occur which could influence decisions in real-time composition, or improvisation. As well as rhythm and pattern exploration, practicing permutations of ideas, scales and phrases, will bring a greater ability to explore these in performance. A possible key to this approach is ‘playfulness’ (a concept highlighted in Nachmanovitch's book), and not getting too formulaic or focused on patterns for their own sake, but using them as springboards for other directions and possibilities.

Study and application of philosophies such as Gurdjieff's takes time and effort, but there are strong, relevant concepts that are utilised in contemporary writings dealing specifically with the art of improvisation. An understanding of these concepts and practice methods such as those proposed by Pilc, would be beneficial to student and educator alike, regardless of capability and time to assume a mentor/mentee relationship.

Gurdjieff's ‘Law Of Three’ can be seen in light of Schillinger, in that Schillinger's methods provide a way to overcome the barriers (fear, self-criticism etc.) to the objective of composition and improvisation.



Fig 3.2

This section is basically just a repetitive motif, with embellishment. Within the 4/4 time signature, subgroups could be 3+1 or 1+3. If 1+3 is expanded: $1(1+3)+3(1+3)=4+12$, which corresponds to the notation of Fig 3.2, or $2/4 + 6/4$ (with $t=1/8$). While this comparison may not actually reflect the composer's intention, in this instance there are nonetheless strong relationships between Schillinger's techniques and the compositional structure.

The C and D sections constitute quite a different approach to the rest of the tune, providing an even greater contrast. The C section starts in G major, and the half-note chordal rhythm implies an almost march-like quality to the piece. Combined with the Romantic classical influence in the harmony (open, triadic voicings and inversions with strong voice-leading in the bass), this section implies a sense of triumph or victory, which could be the intent hinted at in the title.

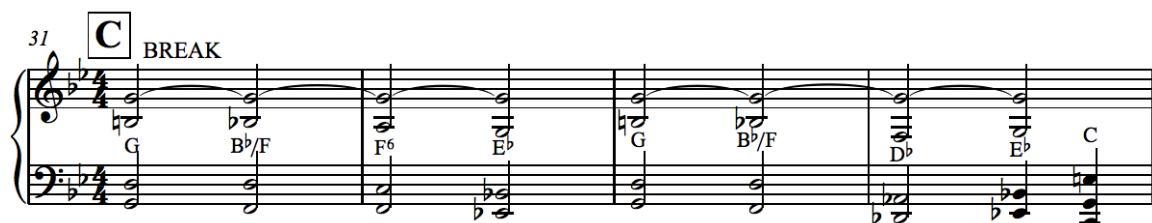


Fig 3.3

(There is a strong similarity in form to Herman's composition *Paluszki* from an earlier album *A Time For Everything*. (Herman, 2007). The bridge section in this tune displays a very similar 2/4 feel and harmonic movement). The D section sets up the return to the Gmin harmony. Schillinger's techniques are less obvious in these sections, but the combined rhythmic head, and harmonically rich middle section, combine with these later sections to form an exciting and structurally rich composition.

44 **D** 2nd time: bass play the melody

C/G Gm7 F#m7 Fm Gm6 A[♭]Maj⁹ E[♭]/Gm Em7 Fm

Fig 3.4

Perpetua

From Herman's 2009 album *Muse*, (Herman, 2009) this angular, chromatic piece reveals some definite Schillinger-influenced compositional techniques.

Fig 3.5

The primary section (Fig 3.5) is built off a repetitive linear rhythmic pattern between left and right hands for the piano part. The chromaticism is clearly evident in the first two bars of the treble clef (B,C,Db), as well as the bass clef sixth-interval pattern (Eb and C, E and Db). The symmetry or balance in the first three bars, expanding to a major 7th in the bass (bar 2) before descending, is nicely offset by the 7/4 pattern in the 4th bar. The angularity in the first three bars is achieved by utilising predominately intervals of 6 and 7. In bar 4, the bass pattern is a classic Schillinger idea demonstrating the permutation of pitch-

scale intervals. The intervals of a major 6th and minor 2nd are swapped between the first two groups of three notes (6,2) (2,6) – a clear incorporation of symmetry.

There seem to be two ideas employed here: firstly, the use of permutations of a small group of note pitches; and secondly, the concept of ‘attack groups’, here demonstrated by groupings of three notes: 1/8th, 1/4, and dotted 1/4 (Fig 3.6).



Fig 3.6

These attack groups of 3 produce the syncopation in bar 4, which is a hallmark of using a rhythmic ‘cell’ that has a different time duration to the meter (See Fig 1.12 & 1.14). This grouping of 3 continues from bar 9 through to the end of the A section.



Fig 3.7

The B section shifts up in tempo and moves into 5/4 with a repetitive rhythmic grouping of five 1/8th notes split into 2+3 across the two hands. The angularity is sustained by the use of augmented and diminished octaves. Counterpoint is achieved by the left hand moving chromatically down while the right hand moves upwards. The note choice here seems more to do with the physical pattern of the two hands, as the section has a natural and comfortable performance aspect.



Fig 3.8

At bar 21, the time signature alternates between 7/8 and 4/4 (or 8/8), with a 3-note right-hand figure. The melodic rhythm becomes a 3+4, 3+5, 3+4 idea before changing again into 9/8 where the 3-note attack group is finally settled for 4 bars. There is a strong evidence of symmetry in these bars, with the right-hand 3-note pattern at bar 21 inverting to the left-hand pattern at bar 25 (the minor 2nd interval also shifts from the first two notes, to the last two).



Fig 3.9

The techniques of 'attack groups', permutations and repetition (as indicated by the title of the piece) are very strong, and while there may be no obvious interference pattern and distributive powers in the composition, nevertheless there are references to Schillinger's mathematical approach.

The solo section however, presents quite a contrast, as it is 40 bars, in 4/4, and harmonically intense. There is a strong polychordal element to the harmony and the section itself seems to be through-composed, with very little indication of tone centres. This contrast appears intentional, being almost the exact opposite

of the highly-rhythmic, repetitive and linear head. (Refer to the Appendix for the complete chart). There is a very unique flavour to this tune, which juxtaposes the angular rhythmic elements with the free-sounding tonal ambiguity of the solo section.

Trylon

From *Follow The White Rabbit* (Herman, 2011), *Trylon* is an up-tempo 3/4 swing tune which features rich harmony, mixed-meter, and a strong rhythmic sensibility. The initial theme (Fig 3.10) has a sustained melody to offset the drum pattern complexity.

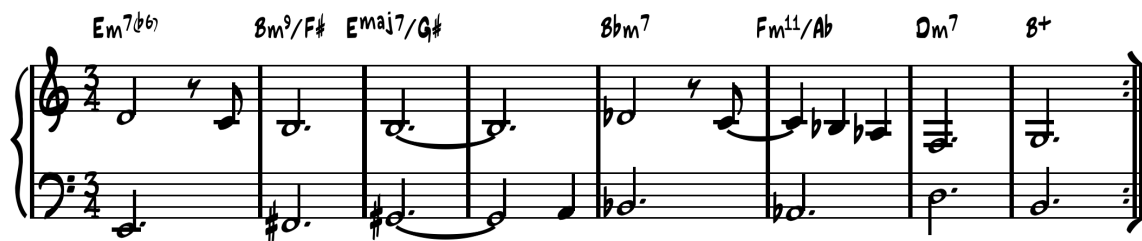


Fig 3.10

Upon initial examination, there does not appear to be specific incorporation of Schillinger techniques, however there are some strong mathematic ideas present. The harmony (and the title of the tune) implies the use of tritones and can be seen in the comparison of the first four and last four bars of Fig 3.10.

Eminb6 → Bbminb7

Bmin9/F# → Fmin11/Ab

Ema7/G# (G#minb6) → Dmin

The use of counterpoint in the first four bars is balanced by the descending melodic line and bass part in the second four bars. The melody itself could be described as motivic three-note 'cell' development. However, even here, the rhythm interference pattern can be seen in terms of *attack groups* of notes. The pattern formed in Fig 3.11 is derived from the interference pattern of 3:2 (2112) (Fig 1.16).

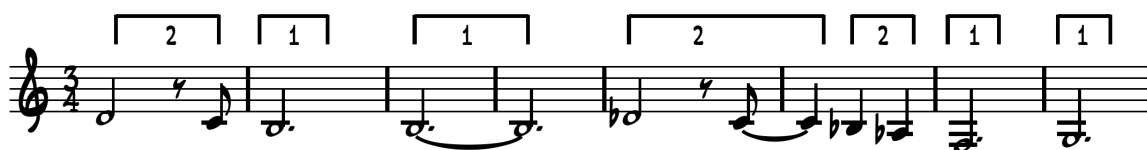


Fig 3.11

In bars 10-13, Herman's fondness for chromatic lines and harmonic movement (as seen in *Perpetua*), is displayed, along with the left and right-hand rhythmic 1/8th note interplay also seen in the head of *Perpetua*. Further analysis of the left-hand rhythm reveals once again, a reference to Schillinger interference patterns, this time in note durations, and following the second method generation of 4:3 (3121111213). The last note is held to fulfil the bar requirements.

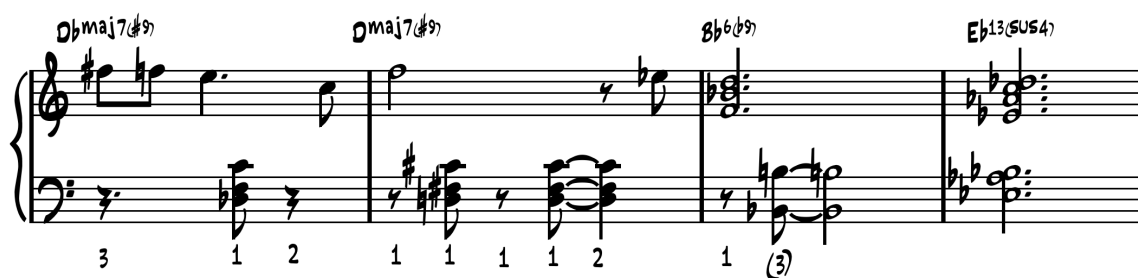


Fig 3.12

The *B* section moves into a more sustained melodic form, with a hint at a tonal centre (Fig 3.13). The first three bars are a standard 'back-door' progression to the G#min, with the G#min appearing to be a substitute for a Bmaj, rather than the C#m – F# being a substitute II-V (for A#m – D#), due to the melody. G#min creates a more interesting harmony for the B melody note. The B is sustained over a Cmaj7 chord next, which is interestingly the *psychological reciprocal* of the implied Bmaj7, around the pitch axis of B.



Fig 3.13

The melody moves from there in an ascending fashion to the C on the Bbm11 chord, while the harmony mirrors the initial theme by ascending and descending.

The chord choices seem to be mostly non-functional (apart from creating direction), and serve to achieve maximum interest under the melody. The Bbm11 now serves as a tone centre, which is reinforced by a repeated motif in the next section built simply around a bVI – V – I progression in Bbm.

The final section is a repeated coda which occurs after solos, and is a simple repeated motif over the same C#m – F#^{6/9} – G#m progression (with a Em/maj7 chord to create a nice contrast turnaround back to C#m every eight bars). The ending is a very simple B note over a B triad, reminiscent of Keith Jarrett (for example the ending of *Falling In Love With Love* from *Standards Live*) (Jarrett, 1987), providing an almost anti-climatic ending to the harmonic richness that preceded it. This comparison to Jarrett here is justified, as Herman cites Jarrett as a major influence (Herman, 2012).

Trylon is a dynamic and harmonically intense tune, but with a strong melodic flow and movement. Schillinger techniques used in this tune are subtle, and may not have even been that intentional in the composing process. However

the study that Yaron Herman had been immersed in initially in his career, appears to have had an unconscious effect on his writing.

Clusterphobic

Also from *Follow The White Rabbit* (Herman, 2011), this tune demonstrates other influences upon Yaron Herman's compositional approach. It has an extended *rubato* introduction, before bringing in a modal-based section. There is almost no melodic head, rather, a Bbm11 rhythmic pattern when the tempo arrives. The title and performance instructions on Herman's own score reveal the intent behind the composition, namely influence from minimalist composer Steve Reich, with the use of cluster voicings. Herman is a fan of American minimalist composers such as Reich. In an interview (Herman, 2012), Yaron Herman mentions a favourite Reich album *Daniel Variations* (Reich, 2008), and in fact the first piece *I Saw A Dream* features very similar piano chord clusters to those Herman uses here.

The polytonal dissonance presented by these voicings can have an unsettling effect on the listener, a device which obscures the tonal centre and which Herman appears to favour. Herman balances these clusters with very open, quartal and quintal chords, plus extreme pitch ranges, to create a textural approach (Fig 3.14).

Figure 3.14 shows a musical score for Piano and Bass. The score is in 4/4 time. Measure 1 is marked with a box 'A'. The score shows complex chordal textures with many sharps and flats. Measure 5 is marked with a box '5' and the text 'Open Steve Reich clusters'. Measure 10 is marked with a box '10'.

Fig 3.14

The solo section is introduced by a Bb pedal with triadic variation above, creating tension and release to the Bb9sus chord.

Figure 3.15 shows a chord progression diagram. The chords are written in 4/4 time with treble and bass staves. The chords are: D/Bb, B/Bb, G/Bb, Gb/Bb, and Bb9(sus4).

Fig 3.15

This sets up the resulting 12 bar solo section consisting of the following chord progression:

	Bbm11	////	Bbm7	Bbma7
Ebm6/9	C/Eb	Bbma7	Bbm7 Dma7	
F#m11 Abma7	Em7 Ema7	Bbm11 Bbma7	Bbm7 Bbm11	

The form seems to follow a general minor blues approach with a turnaround that creates an angular tritone resolution back to the tonic minor (a harmonic movement that also tends to be a signature of Herman's writing, as in tunes like *Trylon*).

While there may not be obvious Schillinger techniques here, the influence of other sources, such as classical music, is of interest. These influences can be seen in other compositions, such as the C and D sections of *The Mountain In G Minor*, *Rina Ballé* amongst many others. Herman mentions that Opher Brayer also encouraged exploration and interest in a wide range of spheres, musical and otherwise (Herman, 2012).

Airlines

The final tune that I will analyse is again from *Follow The White Rabbit* (Herman, 2011). It is included here as it demonstrates the use of melodic permutations. The tune uses a double-time contemporary swing feel built around a 1/16th note rhythmic pattern in the melody, with an AABC 32-bar form.

There are a few different permutation concepts used here, the main one being that the original four-note motif in bar one is used as a rhythmic element throughout the piece.



Fig 3.16

The bar-groups could also be labelled as in Fig 3.16 with the ABC combination repeated in bars 5-8 (with extension occurring on the C phrase). These first eight bars are then repeated with slight variation for the next eight bars. At bar 17, the combination of groups changes (Fig 3.17).

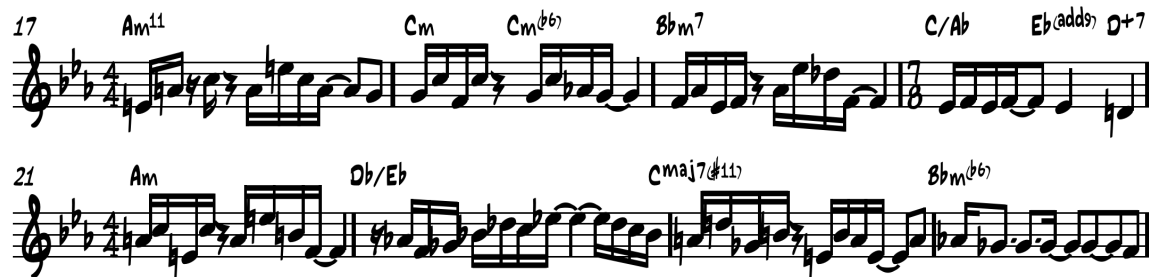


Fig 3.17

The combinations here could be rhythmically interpreted as the first bar of the C phrase repeated three times, followed by B in bars 17 to 20, with a similar idea in the next four bars. This time the full C phrase rhythm is used in bars 23 and 24. There is a rhythmic departure in bar 22, which is taken and developed in the final eight bars. The final section of the tune is a repeated four bar phrase (Fig 3.18).

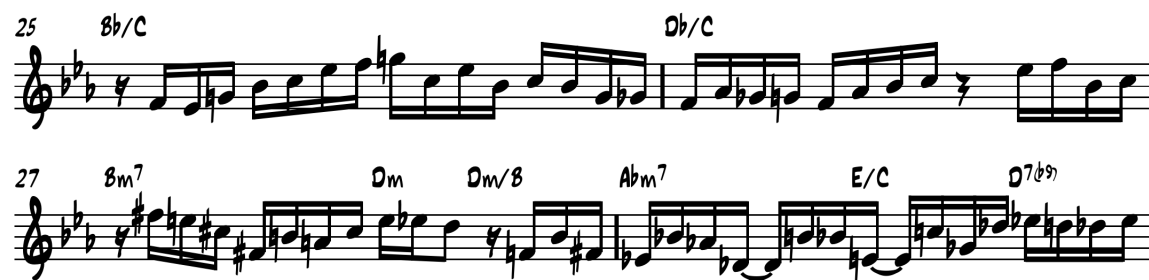


Fig 3.18

The rhythm and melodic contour of bar 22 is repeated in bar 25, and expanded upon, culminating in a repeated three-note sequence in bar 28.

The entire piece has a definite *acceleration* to it, in terms of melodic rhythm, starting from four and five-note phrases and finishing with 14 and 15-note phrases. This concept of acceleration is explored by Schillinger in Book 1, Chapter 14: *Rhythms Of Variable Velocities* (Schillinger, 1946, p. 90). Here,

Schillinger applies various 'natural' harmonic and summation series to rhythms to create growth series, which can be used in acceleration and retardation, and in fact, combined among various parts (e.g. melody and chordal rhythms).

A number of different arithmetic series can be used in this case, although to be utilised in a 'natural' way, Schillinger mentions that the master time signature should appear in the series. Examples of such series can be seen in the Fibonacci pattern:

1,2,3,5,8,13,21.... (where each successive element is produced by summing the previous two: $1+2=3$, $2+3=5$ etc.)

Second and Third Summation series can also be used:

1,3,4,7,11,18...

1,4,5,9,14,23...

as well as Harmonic series (1,2,3,4,5...), and Prime Numbers (1,2,3,5,7,11...).

Schillinger mentions the importance of variable speeds especially in composition for stage, dance and film music. These acceleration devices have in fact been an important factor in these disciplines since Schillinger wrote this, and the emotional and physiological impacts of acceleration and retardation in both dance and film music is well-known (Gomez & Danuser, 2007).

In the tune *Airlines*, an idea of the Third Summation series can be seen even in the first section (and as 4/4 is the time signature, 4 appears in the series). From figure 3.16, bar one (and five) could be seen as a group of 4, bar two and six can be seen as 5, and bar three is a group of 9. Also in bars 25 and half of 26 (Fig 3.18), the 16th note phrase is 23 notes long.

As the pattern is not truly repetitive or clear, most probably Yaron Herman did not consciously compose with a set number series in mind, however the concept of the motion and acceleration from such ideas would have been familiar to him, especially 'natural' groupings of notes in this way.

Finally, permutations of individual notes can be seen in this piece, such as with inversions of notes (first four notes of bars 1 and 3; beginning of bar 5 and end

of bar 8), as well as sequencing (bars 6 and 7; bar 28). It is most likely that Yaron Herman did not intend to be specifically constrained by Schillinger techniques in composing this, but used the initial four-note motif to guide him by playing around with it, modulating it and letting the technique *inspire* the music, much like he explains in the TED presentation (Herman, Three Note Symphony: Yaron Herman at TEDxHelvetia, 2012). Here he demonstrates taking a simple group of three notes and manipulating them in a similar manner by permutations, to begin to create a composition.

Part 4: Original Compositions

A number of original compositions were developed utilising different Schillinger techniques, which will be analysed below. While some compositions were formed from deliberate and specific devices, others were more 'open' and were inspired by playing around with techniques, a process that allowed the spontaneous creative element to have equal input. However, in all the tunes, the guiding factor was the musical output, and techniques were either manipulated or discarded if the end result was not satisfying to the composer.

Avivah

This piece was developed from a melodic motif based around the chords of Fm7 and Emaj7 (bars 1-4 Fig 4.1). The subgroup of 4+1 (or 4+1/2+1/2) was a consideration that was utilised especially in the next eight bars (bars 9-16), otherwise the melody and harmony was composed from a predominately intuitive and musically satisfying approach.



Fig 4.1

The section from bar 25 permutes bar elements from bars 9-16 and creates four-bar rhythmic phrases that are cycled (AB, BA) as per Fig 4.2.

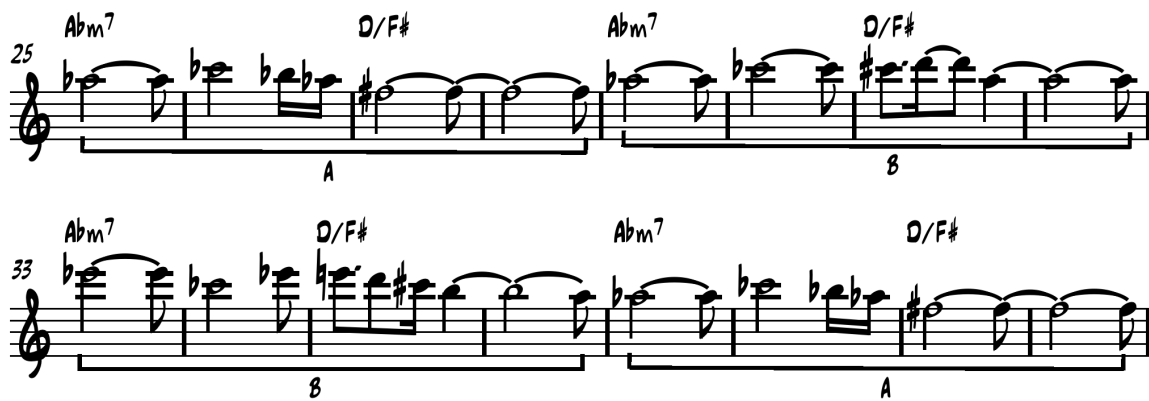


Fig 4.2

This was an intentional construction to create a sense of symmetry, but it also highlights a strong theme built over the two chords and creates a memorable ‘hook’ and stability to the moving tone centre of the first 16 bars. This section then contrasts with the darker eight-bar, melodic minor-flavoured harmony of bars 41-48 (Fig 4.3).



Fig 4.3

The only other technique used in this piece that draws from Schillinger is the rhythmic repeated end section from bar 109. Here a 3/8 guitar rhythm made up of four notes (in the duration pattern of 1,2,2,1 with $t=1/16$) is played against the 5/8 piano figure (Fig 4.4).

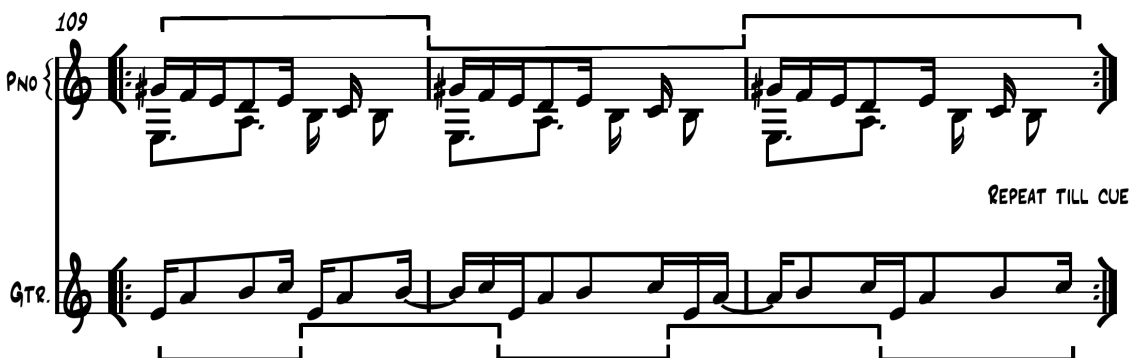


Fig 4.4

The 1/16th note duration pattern of the guitar line (1,2,2,1) is the same as the 3:2 interference pattern 2,1,1,2 (Fig 1.16), but displaced. The polyrhythm generated creates an intense, unresolved shifting movement, which works well as an outro for the piece. This tune was predominately composed from a motivic idea with some permutation concepts, but as it was already harmonically intense and rhythmically interesting with the 5/8 time signature, did not suit further manipulation.

Across The Board

This tune was specifically composed from a bass line generated by a Schillinger process. The bass line rhythm duration was formed from squaring the 4/4 subgroup of 3+1. $(3+1)^2=9+3+3+1$ (see Fig 1.20), while the pitch intervals were determined by the squared subgroup of 5/4 or 3+2. $(3+2)^2=9+6+6+4$. The choice of the 5/4 subgroup was arbitrary, however the pitch intervals and rhythm that resulted created an angular, dynamic ostinato that inspired the rest of the composition.



Fig 4.5

Fig 4.5 displays the rhythm durations above the bass line ($t=1/8^{\text{th}}$ note), with the pitch intervals below. Note that if the last interval of four semitones from D to Gb ascends, it would be followed by a leap of a minor 9th down to the F, hence the Gb is dropped the octave to provide a more suitable bass line construction.

The choice of harmony resulted from playing the bass line over an aggressive drum pattern, and suited the driving nature of this line. The busy melody provides more momentum and a contrast to the slower chord change rate (Fig 4.6).



Fig 4.6

The B section of the tune inverts the contrast by more of a sustained melody over a static, but very rhythmic, harmony. The chord and bass rhythm was determined by yet another pattern, that of the interference resultant of 4:3 – 3,1,2,2,1,3 (Fig 1.16). In this case, the 1 was applied to a rest rather than a note and the durations of each note are not determined by the pattern, only the placement ($t=1/8^{\text{th}}$ note).



Fig 4.7

In other words, the notes only occur on the start of a group of three $1/8^{\text{th}}$ notes, the groups of two $1/8^{\text{th}}$ notes, and the last group of three $1/8^{\text{th}}$ notes. The pattern formed in Fig 4.7 is then a cyclical three-bar rhythm, which is explored more fully in the guitar solo section.

The exploration and deliberate incorporation of Schillinger techniques in this piece provided an exciting and dynamic way of composing, and arrived at outcomes which departed from the familiar or solely intuitive compositional methods. While the mathematical choices were still mostly arbitrary, the fact that they do rest upon firm mathematical foundations, produces results that do make sense and ‘work’ in a musical sense.

Traveller

A conceptual piece, designed around a journey as indicated by the title. This could be any journey but the idea was formed from the different phases of sleep – alpha and theta wave activity, progressing towards SWS or slow-wave sleep and finally REM or rapid eye movement. However, being conceptual, the different sections in the piece could be interpreted as different REM phases that occur through a sleep period, and thus different dreams.

The piece is split into three definite sections, with only a tenuous idea linking them, as per dream or sleep states. The sections have each only a simple, repetitive sketch idea on which the improvisations and thus ‘journeys’ are built in performance. Each section has an intended build in intensity, before an abrupt change in dynamic leading to the next section, with the final section creating the greatest climax. This section is propelled by a repetitive 1/8th note piano figure, and is similar in concept to the *acceleration* process discussed in the analysis of Herman’s *Airlines* in Part 3.

In terms of Schillinger techniques, the only one used was that of permutating a group of notes (in this case, four) to create the A section melody (Fig 4.8).



Fig 4.8

The notes, as indicated above, are D, F#, G and A. These create the basic melody, which inspired a classical-sounding harmony, and *response* section from bar nine. There was no set order or decision made in arranging the notes, rather once the intent was made to use those notes, they were played with until a melody and harmony was formed that reflected the composer's emotion, and thus became the inspiration for the rest of the composition.

The B section idea is simply constructed from a set note pattern of octaves and fifths in the left hand, with major 2nds and perfect 4ths in the right.



Fig 4.9

The final C section illustrates the repetitive F# note, and also brings a reference to the four note idea at the beginning, by the use of a four note bass line (Fig 4.10).

C BUILD IN INTENSITY, GUITAR SOLO TO FINISH

35 E_m^7 B_m^7 $F\#m$ D B

41 BASS BRINGS IN LINE BASED AROUND THESE NOTES:

Fig 4.10

The Stream

Written for just piano and string trio. The initial concept was to use just four notes: D, Eb, G, Ab, and to *commit* to those choices as Yaron Herman mentions in the quote given at the beginning of this thesis: *“When you make music it’s about expressing emotion, it’s about connecting to the choices you make. The goal I would try and impose on myself was when I choose something to play, I must commit to it – I must give content, context, intention, dynamics to whatever I play. So if I start very simple, 1-2-3 (C, D, Eb), I listen to what I’m actually playing, then find what I feel right now.”* (Herman, 2012).

From that idea, the notes were played and harmonised until something developed that *connected* emotionally. A couple of other notes and chords were introduced to bring the ideas into an eight-bar phrase, and the basic piece was conceived. The four notes are the melody line as illustrated in the first two bars of Fig 4.11.

10 $D\flat maj7(\sharp 4)$ $E\flat m^{11}$ $Gm7(\flat 6)$ $B\flat/Ab$ $D\flat maj7(\sharp 4)$ $E\flat m^{11}$ $Gm7(\flat 6)$ Ab

14 $D\flat maj7(\sharp 4)$ $E\flat m^{11}$ $Gm7(\flat 6)$ $B\flat/Ab$ Fm^9

The musical score consists of two systems of piano accompaniment. The first system (measures 10-13) and the second system (measures 14-15) are written in a key signature of three flats (B-flat, E-flat, A-flat). The notation includes complex chords with extensions and alterations, such as $D\flat maj7(\sharp 4)$, $E\flat m^{11}$, $Gm7(\flat 6)$, $B\flat/Ab$, and Fm^9 . The melody in the right hand is characterized by wide intervals and chromatic movement, while the left hand provides a harmonic foundation with sustained chords and moving bass lines.

Fig 4.11

From there a decision was made to create counterpoint melodies using cello and violin.

The musical score for Figure 4.12 is divided into two systems, each with piano and string parts. The piano part is written in a grand staff (treble and bass clefs), and the string part is written in a grand staff (treble and bass clefs). The key signature is three flats (B-flat, E-flat, A-flat).

System 1 (Measures 26-30):

- Measure 26:** Piano part has a chord of Dbmaj7(#4) Ebm11. String part has a whole note chord.
- Measure 27:** Piano part has a chord of Gm7(b6) Bb/Ab. String part has a whole note chord.
- Measure 28:** Piano part has a chord of Dbmaj7(#4) Ebm11. String part has a whole note chord.
- Measure 29:** Piano part has a chord of Gm7(b6) Ab. String part has a whole note chord.
- Measure 30:** Piano part has a chord of Dbmaj7(#4) Ebm11. String part has a whole note chord.

System 2 (Measures 31-34):

- Measure 31:** Piano part has a chord of Dbmaj7(#4) Ebm11. String part has a whole note chord.
- Measure 32:** Piano part has a chord of Gm7(b6) Bb/Ab. String part has a whole note chord.
- Measure 33:** Piano part has a chord of Gm7(b6) Bb/Ab. String part has a whole note chord.
- Measure 34:** Piano part has a chord of Fm9. String part has a whole note chord.

The string part is marked **EXPRESSIVO** and features a melodic line in the violin and cello parts, with the cello part playing a more active role in the lower register.

Fig 4.12

A B section was added, built around a simple I-bVI-IV-V progression in Cm to showcase the strings. The actual progression resolves to a bIIma7 (Dbma7) every third cycle, and the initial violin and cello lines from Fig 4.12 are superimposed upon this progression in the last eight bars. The final section creates an ostinato build with unusual note choices in the strings, and this section was later added, *sans piano*, to the beginning of the tune as an introduction.

The piano solo, which occurs over the main theme, is accompanied part-way through by the string trio. Schillinger techniques were used in the note rhythm to create internal movement within the parts as can be seen in Fig. 4.13.

The musical score is divided into two systems, measures 50-53 and 54-57. The piano solo is written in the upper staves, and the string trio accompaniment is in the lower staves. The key signature is D-flat major (three flats). The piano solo features a sequence of notes with fingerings (1, 2, 3) and accents (MP). The string trio accompaniment consists of a rhythmic pattern of eighth notes in the right hand and a more complex pattern in the left hand, including a 9-measure rest and a 3-measure rest. The score includes chord symbols above the piano solo: D-flat major 7 (sharp 4), E-flat minor 11, G minor 7 (flat 6), B-flat/A-flat, D-flat major 7 (sharp 4), E-flat minor 11, G minor 7 (flat 6), and A-flat. The second system includes the chord symbol F minor 9.

Fig 4.13

The note durations of the second violin and cello were determined by sub-grouping the main time signature (4/4) into 3+1 and the reverse 1+3. These are squared using $a^2 + a.b + b.a + b^2$ (Fig 1.20), to create 9+3+3+1 and 1+3+3+9. The four notes chosen to fit these patterns became the cello and second violin parts,

respectively. The first violin part was created from the interference resultant of 4:3, or 3,1,2,2,1,3. What creates the movement in the string section, is that while the cello and second violin patterns work nicely over four bars, the first violin part is a repetitive three-bar phrase of six notes. The resulting shifting harmonies and colours create an interesting inner movement and texture to the section, without being too busy behind the piano solo.

The intro and outro section (Fig 4.14) was created from chord juxtapositions that were attractive and interesting as another contrast or texture in the piece, but the chord durations or rhythms were obtained by expanding the subgroup of 3+1. Therefore $a(a+b)+b(a+b)=12+4$. Four $1/8^{\text{th}}$ notes were kept as the final chord duration, while the 12 was divided into four groups of three $1/8^{\text{th}}$ notes, i.e. a dotted quarter note.

The musical score for Fig 4.14 consists of two systems. The top system is for the piano, with a grand staff (treble and bass clefs). It features five measures of chords, each with a label above it: $F\sharp maj7(\sharp4)$, $E\flat/9$, $G maj7(\sharp4)$, Dm^{11} , and $B\flat maj7(\sharp4)$. The bottom system is for the strings, with three staves (treble, middle, and bass clefs). The first violin part (top staff) plays a repetitive three-bar phrase of six notes. The cello and second violin parts (middle and bottom staves) play patterns that work over four bars. The rhythm is based on the expansion of the subgroup 3+1, resulting in a dotted quarter note for the final chord duration and four groups of three eighth notes for the 12.

Fig 4.14

All of the Schillinger techniques of creating structures from number patterns worked very well for this composition, and produced extremely pleasing results. It was well worth taking the time to apply and explore these concepts, as in

practice, many of Schillinger's techniques are musically and compositionally useful, once some of the initially daunting mathematics are tackled.

Beyond Words

Rather than utilise any specific Schillinger approaches in composition, the aim with this tune was to compose from a more purely emotional state and allow the music to “play the composer”, rather than the other way round. Psychological preparation exercises as highlighted in the books by Kenny Werner (Werner, 1996) and Stephen Nachmanovitch (Nachmanovitch, 1991), were engaged with as an attempt to quieten internal distractions and achieve a degree of *flow* or stream-of-consciousness.

Most successfully this was accomplished in the A section of the piece, especially the first four bars, with the melody and harmony being generated simultaneously and fairly quickly. The tricky part was to capture and retain the idea without losing that flow, which was only partially successful. Further self-training would facilitate a greater ability to sustain that. However these bars were enough of a trigger or inspiration to develop the remainder of the A section reasonably quickly, while retaining a sense of the emotion of the first four bars.

A

COLLA VOCE $A\flat m^7$ $E\flat/F$ $A^{maj7}(\sharp 4)$ $E m^{(maj9)}$ $E\flat m^{11}$ $G^{maj7}(\sharp 4)$ $F\sharp m^7$ $D\flat^7_{ALT.}$

6 $D m^7$ $F m^6$ $E m^7$ $E\flat^7_{ALT.}$ 12. $F\sharp m^7$ $G/F\sharp$ $F\sharp m^7$ $G/F\sharp$ C/D $D m^7$

A TEMPO

11 C/D $D\flat^7_{ALT.}$ $F\sharp m^7$ $G/F\sharp$ $F\sharp m^7$ $G/F\sharp$ C/D $D m^7$ C/D $D\flat^7_{ALT.}$

REPEAT A FOR PIANO SOLO

Fig 4.15

Interestingly, the B and C sections were developed from fragments of ideas that were already in mind, but they seemed to fit in the context of how the tune was unfolding and so were adapted for the composition. The B section is a four bar pattern I-bVII-III-VI Em progression in 7/8 which is used for the trumpet solo, while the C section (Fig 4.16) is the basis for the guitar solo. The ‘trades’ between sections and solos create an excellent platform for performers to create a build to the piece.

$A m^7$ $A\flat m^7$ $C m^7$

$F m^{11}$ $G 7(\flat 9 \text{ SUS } 4)$ $D\flat^{maj7}(\sharp 4)$ $E\flat^{(add9)}/C$ $E\flat^{(add9)}/G$

2

Fig 4.16

An open piano solo is included between the first B and C sections as a link to the ‘flow’ compositional process of the tune, and provides a real-time option to

engage in a similar process. The solo section is not prescribed so it could be rubato or based around a rhythmic structure. The solo leads from a 7/8 section and brings in the subsequent 4/4 section, so some rhythmic changes or adaptations need to occur. Similarly the harmony is open, so the intention is for the performer to create something that reflects their emotion, and the physical performance space.

The notion of improvisation being considered as ‘Real-Time Composition’, a topic that Yaron Herman has actually lectured on at Sorbonne University (Gelin, 2009), can be seen from another perspective here – where the goal of the improvisation was a recorded composition. The processes for both composition and improvisation are the same, and the importance of being ‘in the zone’ or emotionally connected when improvising is also an important aspect of composition. Similarly, the understanding of form, structure, contrast and balance is essential to creating strong improvisations, which is why certain of Schillinger’s permutation and rhythm techniques are also potentially very useful to improvisation.

Emotional content should be a primary element of both improvisation and composition, but in both cases, this needs to be balanced by form, structure, dynamics, symmetry. Otherwise improvisation could become meaningless abstraction, and composition may never develop past an initial idea. Schillinger concepts are a means to create that framework and balance in both composition and, to an extent, in improvisation.

Temporal

The final original composition is one that utilises the greatest number of techniques discussed. Writing in this way was an intended process, designed to explore possibilities and determine the practicalities of these systems. From the outset, the idea of a 3/4 swing tune was chosen as the vehicle for the composition as a contrast for the other pieces.

The first technique selected uses different interference patterns for *attack groups* and *durations*. (See Fig 1.35). In this case, the interference pattern of

5:4 (41322314) was chosen for attack groups, while the interference pattern of 3:2 (2112) was chosen for note durations. Other combinations were tried, but this combination resulted in chord durations that worked with the 3/4 time signature. It was discovered that if the *first* number of the second pattern (in this case 3), and the *second* number of the first pattern (in this case 4) corresponds to the time signature, then the chord durations will work with the time signature of the piece.

Attack Groups	4	1	3	2	2	3	1	4
Durations	2,1,1,2	2	1,1,2	2,1	1,2	2,1,1	2	2,1,1,2
Chord Durations	6	2	4	3	3	4	2	6

Fig 4.17

The chord durations in Fig 4.17 are determined by the resultant of the note durations in the line above. Initially the composition was obtained as in Fig 4.18 with attack groups indicated by the brackets, the number below each note are the note durations, and chord durations are set following the bottom line in Fig 4.17.

The musical notation in Fig 4.18 consists of two staves of music in 3/4 time. The first staff contains four measures with chords $E\flat maj7$, Dm^{11} , Bm^7 , and G/F . The second staff contains four measures with chords $G/F\sharp$, $A\flat m^{11}$, $A m/B\flat$, and $F/D\flat$. Brackets above the notes indicate attack groups (4, 1, 3, 2 for the first staff and 2, 3, 1, 4 for the second staff). Numbers below the notes indicate note durations (2, 1, 1, 2 for the first staff and 1, 2, 2, 1 for the second staff).

Fig 4.18

The melody and harmony does work together but the melody is too static for a practical swing tune. So with some adjustment and added syncopation, the melody was developed as shown in Fig 4.19.

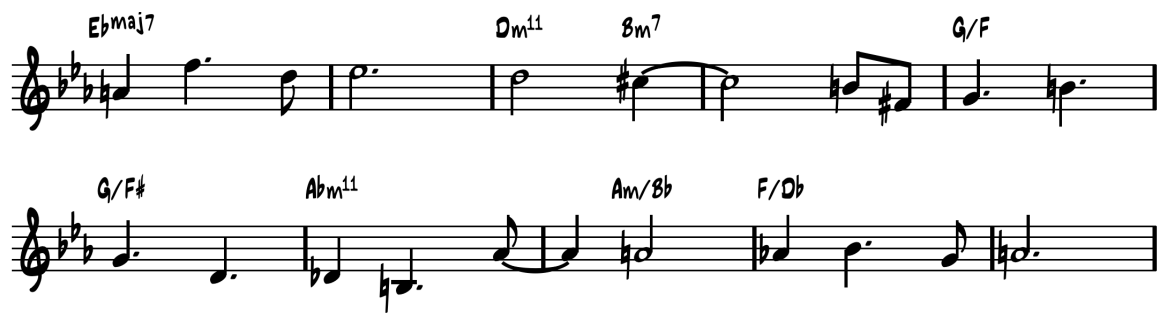


Fig 4.19

A decision was made to try another technique, that of circular permutation of note rhythms. So with the first four note rhythms of Fig 4.19 given the labels ABCD, the rhythms were cycled in a clockwise manner (BCDA, CDAB, DABC).

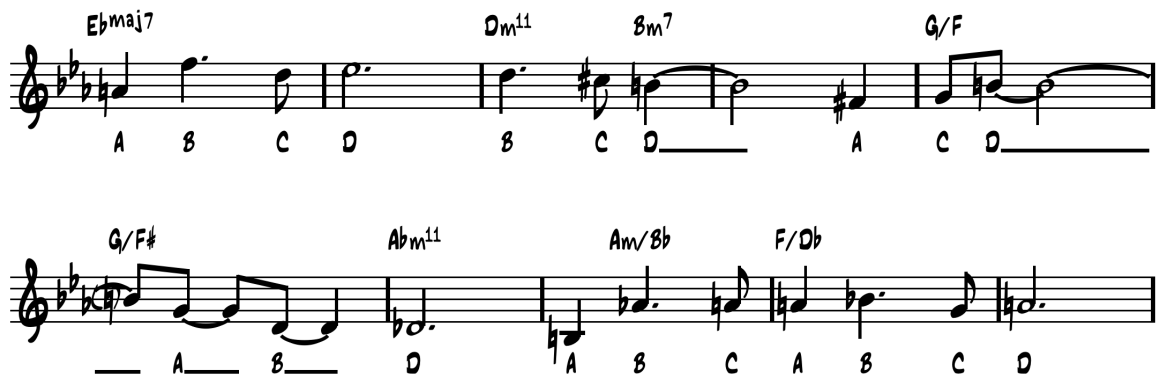


Fig 4.20

The result was very pleasing and suited the feel and structure of the piece extremely well. This became the final note rhythm of the main section. However, upon further playing and analysis, it was felt that there needed to be more space and sustain between some of the phrases so two bars were added after the 7th bar and at the end, with the final result shown in Fig 4.21.



Fig 4.21

Another section was needed so the chordal rhythm was decided by taking the subgroup of the time signature (2+1) and squaring it to give 4+2+2+1 (See Fig 1.20). The choice of harmony for this rhythm was determined by taste and context, as was the melody for this section. In Fig 4.22, the chord duration of 4+2+2+1 is counted with $t=1/4$ note.



Fig 4.22

The decision was made for the trumpet to solo over this section, so for variety the chords were geometrically inverted around the pitch axis of G (tone centre of the section) with the result in Fig 4.23.

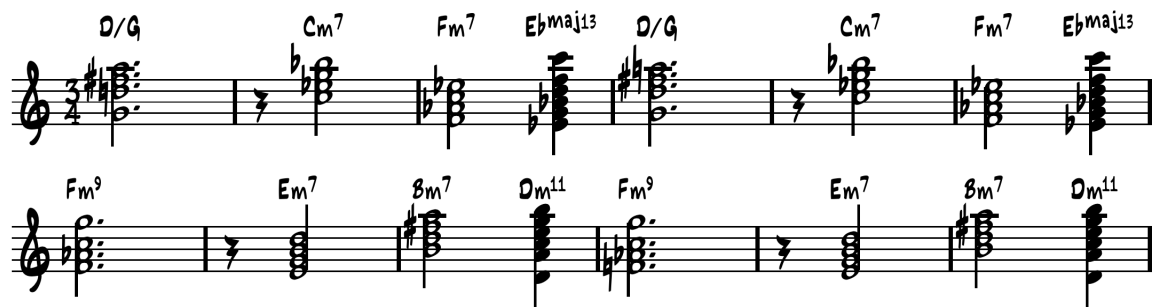


Fig 4.23

For consistency and musical reasons only the chord substitutes of Bm7 and Dm11 (with the Dm11 given a F bass and made into G/F for bass voice-leading) were chosen for the alternate form. This was incorporated into the original four bar progression to achieve an eight bar solo section (Fig 4.24).



Fig 4.24

The compositional process for this piece was an interesting one, and the results were very satisfying. The use of this many techniques could be seen to be more than practical for a compositional process, however the process and experimentation with ideas was rewarding, as there was an inherent musicality to the generated outcomes.

Further study of, and familiarity with, Schillinger, would prove to be very useful and empowering in composition. The writing style and sheer volume of mathematics, however, would be overwhelming to most, so where these ideas succeed today comes from modern educators taking the concepts and adapting them for contemporary music and learning styles.

This is most evident in common jazz textbooks such as *Jazz Composer's Companion* by Gil Goldstein (Goldstein, 1993). Concepts such as melodic contours and pitch axes are presented, along with a very superficial display of rhythmic patterns using similar graph methods that have been discussed here. A criticism of the book might be that little or no acknowledgement of Schillinger is made within the text, and while the rhythm graphs in Goldstein's publication look interesting, no mention is made of creating rhythmic patterns by interference patterns, even on a basic level.

Other jazz educators such as Jerry Bergonzi, utilise more of the permutation concepts in his *Inside Improvisation* series, as already discussed (Bergonzi, 1993).

There has been a recent resurgence of interest in Schillinger as evidenced by online courses offered through the Schillinger Society (<http://www.schillingersociety.com/>). This society was set up by Philip DiTullio, and his research has enabled him to become the foremost teacher of the Schillinger System.

Conclusion

Yaron Herman's rapid development as a pianist within a two-year period, from the age of 16 until, at 18, initially going to Berklee College in New York but developing an international recognition in the process of returning home after two months, is somewhat unique in terms of established educational schema. While a certain proportion of his accelerated progress can be attributed to a precocious 'natural' talent that was discovered and nurtured by Opher Brayer, nevertheless Brayer's unconventional teaching methods stand out as being a definite factor, and thus worthy of research.

Other, more conventional resources were also utilised by Brayer, such as methods developed by jazz educators Hal Crook and Charlie Banacos, but it was the use of Schillinger's methods that were significant in Herman's tuition (Herman, 2012). Similarly, Brayer also incorporated other philosophies such as the Chinese *Tao Te Ching*, but Gurdjieff's principles are also seen in other works on the art of improvisation, as cited in Part 2. Hence they were the focus of this project.

Schillinger's methods were widely taught in the US as compositional theory some 60 years ago, but were largely abandoned as more traditional music theory and techniques were expanded, especially as they encompass the new jazz harmony and modes. In addition, Schillinger's theory required understanding of mathematical concepts, which were seen by many as too complex and also pseudo-scientific, as he used non-conventional terms and operations relative to mathematical and scientific norms (Glied, 2009, p. 26). Schillinger was also criticised for his judgment of the great composers such as Beethoven, Bach etc., in light of his own work (Arden, 1996, p. 18). In the first book of the Schillinger System, the *Theory Of Rhythm*, he mentions "*These procedures were performed crudely by even well-reputed composers. For instance, L. van Beethoven...*" (Schillinger, 1946, p. 21).

However, as has been seen in this research, many of his concepts are extremely interesting and quite musically sound. As a method for exploring

different approaches to composition and improvisation, they have proved to be exciting and useful, and a means of breaking free from contemporary harmonic and melodic constraints. For example, jazz students learn what scales or modes *should* be used over particular chord types, and many practice techniques ingrain these 'correct' combinations so deeply, that these understandings may constrict melodic freedom and exploration. Students can be afraid to experiment outside of convention. Schillinger's techniques can create that 'freedom' without the fear or insecurity of not knowing what to play next, or of playing 'wrong' notes. The mathematical structures of rhythm and pitch scales are a solid framework, yet can afford a greater melodic and harmonic freedom than that offered by other established methods.

Composition shares many of the same processes as improvisation, and here, the creative possibilities can be even more pronounced, as one has time to refine and develop them. These processes have been examined in this thesis. While Schillinger's theories *are* experiencing somewhat of a resurgence online, the incorporation into contemporary jazz education, as evidenced by Opher Brayer, is quite unique. Schillinger's methods, and his books, are inherently complex, so to apply these to general jazz education requires more work in order to incorporate Schillinger into a more contemporary pedagogical understanding. Brayer has done so with some success and an attempt has been made in this project to gain an understanding of how he used Schillinger to incorporate those ideas into practice. Currently there is a lack of published resources in this regard, so developing some of these ideas as demonstrated in this thesis would be useful to provide some alternate concepts and methods for jazz education. It also must be stressed, that these methods cannot be determined to be an end in themselves. The process of selecting and discarding outcomes must occur, based upon the composer or improviser's aural and personal tastes or judgments, as with any other compositional and improvisational concepts.

The use of philosophy and psychology, such as the ideas of Gurdjieff and others, is also uncommon in jazz education. It is true that unless the educator can provide more of a mentoring role, the use of such concepts can be difficult,

as a level of trust and understanding has to be developed before they can be effectively communicated. In much of today's educational system, this can be almost impossible due to time constraints, but with the publication of books such as by Jean-Michel Pilc, practical incorporation of some of these techniques can be achieved. The role of the educator does need to change, however, as in this information age, the knowledge is readily available for students. No longer is the teacher the source of information, but he/she should sit alongside the student to help them consolidate and sift this knowledge into useable techniques. The role might be a more productive one if it involved finding and encouraging passion, and provoking exploration and enthusiasm. Herman expresses the self-motivation that such passion provides:

"The problem isn't with knowledge. There are so many great books and the knowledge is out there – whether you want to talk about scales, or rhythmic displacement. All you need to know about the musical aspects, harmony, modern jazz voicings, comping, polyrhythms – it's out there. The problem isn't about the knowledge, the problem is about the 'being.' And the being is something you don't learn, not in life, and not in music schools. There's a reason for that – the reason is that it's very hard to do, because that would require years of adapting to each student and basically working like a psychoanalyst. We know that therapy takes a long time – it's an engagement, a long process, and it's not worthwhile financially to anyone, and it's not fun. However without going that far, there is some stuff you can do: When people understand why they're making music, and why they want to pursue this thing. Do they want to become good players? Ok that's one goal, but maybe there's something else to music that is not just about the ego, that is more than wanting to sound good, more than the desire to be loved and admired. It has more to do with a terrible need to express something that you can't express otherwise. You can't teach people to live, but it's basically about living, about becoming more human. Creation has to come out of a need, a desire, something urgent, not because I can. It's not even a choice – a thing has to be done, has to be expressed, has to be sublimed into something creative otherwise it will kill you."
(Herman, 2012)

It is apparent that Opher Brayer is concerned about achieving a balance in his methodology, a balance between intellect and emotion, epitomised (by Herman's estimation) in artists such as Keith Jarrett – *"For me, he personifies engagement and ecstasy. The almost ideal mix of emotion and intelligence."* (Herman, 2012). The unconventional resources and teaching techniques seem to be at the heart of Brayer's success with students such as Yaron Herman. Brayer freely admits that he is not a piano teacher in terms of technique – and encourages his students to look elsewhere for that. His ability is to enable students to pursue their passion utilising methods which lie outside traditional concepts, a process also evident from his success as a business motivational consultant. Not many teachers are blessed with that talent, nor are many educational institutes constructed with that consideration. It is not necessarily a fault of the educational providers, as curricula are developed with achievable, measurable outcomes in mind.

However, teachers need to be challenged and provoked in their methods and delivery, which is where independent teachers like Brayer provide a touchstone for the effectiveness of their methodology. The competence of Brayer's techniques lies in providing non-traditional pathways to improvisational and compositional approaches, such as Schillinger, as a balance to more standard concepts of harmony and melody. One is not better or more complete than the other – inclusion of some Schillinger ideas would provide an important balance and contrast to traditional techniques, and perhaps a greater freedom in composing and improvising.

Similarly, if study of philosophy and psychology seems unobtainable to the teacher and student, incorporation of practical techniques to aid emotional connection, such as discussed, would be hugely beneficial to producing a student who is able to 'leave their mark' in music, and say something that connects with the listener.

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Appendix A: Yaron Herman Charts

The mountain in G minor

Y.H.

Even ♩ = 176

Piano

PIANO SOLO

3

6

A

PLAY

8

BREAK

11

15

B

Bass

19

Piano

Bass

23 **Piano**

Bass #

Piano

27

31 **C** BREAK

G B^b/F F⁶ E^b G B^b/F D^b E^b C

35 **PLAY**

G B^b/F E^bm⁶ G^b6 G⁶ D⁶ Em⁷ F[#]m D[#]m⁶

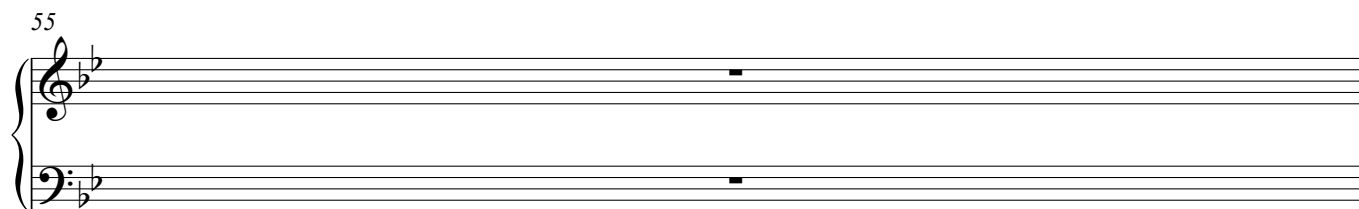
39

C Cm/E^b Fm E⁷ Fm⁷ D/F[#]m B^b/F B^o C/Em

44 **D** 2nd time: bass play the melody

C/G Gm⁷ F[#]m⁷ Fm Gm⁶ A^bMaj⁹ E^b/Gm Em⁷ Fm

52



FORM

Theme

Solo Piano on riff

On Cue: C X2 , first without the 5/4 bar,
second time with the 5/4 into bass solo on D

Ending on the end of 7

PERPETUA

YARON HERMAN

♩ = 108

A

PIANO

5

9

12

1. REPEAT THIS BAR LAST TIME TO FIN

15

2.

17

♩ = 136

19

21

25

29

Dm7 Dm7(b9) Eb(maj7) B7(SUS4) B7(b9)/C Dmaj7(#4) G+7

35

G7(b9)/F Cm7(b6) Fm7 G7(b9) E7ALT. Abmaj9 Abm7 Cm(#4)/Ab

41

Am7 Eb(SUS4) E-7/Eb7b9 C#m7 D7(SUS4) B/D7b9

47

Ebmaj7(#5) A/C# D/C B7(b9) Bb6 A(SUS4b9) Ab7(SUS4) F7ALT.

53

C#m7 Bb(SUS4b9) Gm7(b6) Gbmaj7(#4) Bbm7 Bbmaj7(#4) Bbm/Db E/D

59

A/C A+7 Dm7 D/C F#m7(b5) Gm(maj7)/Bb Eb/Bb

65 $A^{(SUS4b9)}$ $Fm^{(maj7)}/E$ F/G Abm^7 LAST TIME TO 3

69 Ebm^7 Ebm^7/F Gm^7 Ebm^7 Gm^7 $Em^7(b9)$ $A7(b9)$

73 $\text{Dbm}^{(maj7)}$ $\times 4$

REPEAT A (ONCE) TO FIN (EXTRA BAR)

Trylon

Y.H.

A up swing ♩ = 200

Piano

Bass

Tacet 1st, and 2nd time

1.

9

2.

Play

14

B

BREAK BREAK

20

ONLY SOLOS

28

C half time ♩ = 100

even 8

1.

2. first tempo ♩ = 200

Fill

Fill

D.C.

Piano Solo

FORM:

Impro Piano/Drums???

Theme trio (bar 10) play kicks only first time

Theme to Coda (break piano solo)

D loop short to ending

Clusterphobic

YH

rubato ♩ = 100

A

Piano

Bass

15^{ma}

8^{va}

8^{vb}

(8)-----

5

Open Steve Reich clusters

10

B

13

C

17

22

Bbm7sus4 Bbm7sus4 Bbm7 Bbmaj7

26

Ebm6/9 C/Eb Bbmaj7 Bbm7 DMaj7

30

F#m7sus4 Abmaj7 Em7 EMaj7 Bbm7sus4 Bbmaj7 Bbm7 Bbm7sus4

AIRLINES

YARON HERMAN

♩ = 129

C(SUS4) Cm^{b6} Db/C A/F
 5 Cm⁷ Cm^{b6} Db/C Eb/C Fm¹¹
 9 Cm Cm^{b6} Db/C Eb/C A/F
 13 Cm Cm^{b6} Db/C Eb/C F7(SUS4)
 17 Am¹¹ Cm Cm^{b6} Bbm⁷ C/Ab Eb(add9) D+7
 21 Am Db/Eb Cmaj7(♯11) Bbm^{b6}
 25 Bb/C Db/C
 27 Bm⁷ Dm Dm/B Abm⁷ E/C D7(b9)
 29 Bb/C Db/C
 31 Bm⁷ Dm Dm/B Abm⁷ E/C D7(b9)

Appendix B: Original Charts

AVIVAH

ALAN BROWN

$\text{♩} = 190$

9 Fm^7 $E\text{maj}^7(\sharp 4)$ Fm^7 $E\text{maj}^7(\sharp 4)$

2ND TIME TO SOLOS (BAR 49)

17 $Ebm(\flat 6)$ $Em(\flat 6)$

GUITAR MELODY:

25 Abm^7 $D/F\sharp$ Abm^7 $D/F\sharp$

33 Abm^7 $D/F\sharp$ Abm^7 $D/F\sharp$

41 Dm^7 $E7(\flat 9)$ Dm^7 $E7(\flat 9)$ $C\text{maj}^7$ D.C TO SOLOS

BASS SOLO
49 $Ebm(\flat 6)$

57 $Em(\flat 6)$

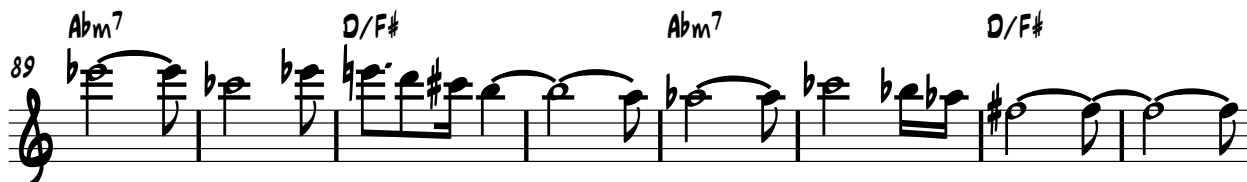
65 PIANO SOLO:



73 GUITAR SOLO:



ALTERNATE PIANO & GUITAR SOLOS TILL CUE



BASS & DRUMS ONLY

105 E7(b9)



109



REPEAT TILL CUE

E. GTR.



ACROSS THE BOARD

ALAN BROWN

♩ = 157

1 **F⁷ALT.** **A^b13** **G^b13** **D⁷ALT.**

5 **F⁷ALT.** **A^b13** **G^b13** **D⁷ALT.**

9 **A** **F⁷ALT.** **A^b13** **G^b13** **D⁷ALT.**

13 **F⁷ALT.** **A^b13** **G^b13** **D⁷ALT.**

17 **B** **D⁷ALT.**

21 **G/E^b** **C/D^b** **B^b/C**

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SAX/ORGAN SOLOS ON A FORM

GUITAR SOLO TILL CUE HEAD

D⁷_{ALT.}

25

25

28

28

TRAVELLER

ALAN BROWN

A

♩ = 118 Em⁷

5 Bm⁷

9 Cmaj⁷ B/D# Em F#7/A#

14 Bm⁷ D/F# Gmaj7(#4)

BASS SOLO OVER A SECTION. CUE TO B

B

19 Fmaj7(#4) Dm¹¹ Am¹¹ Fmaj7(#4) Dm¹¹ Am¹¹

23 Fmaj7(#4) Dm¹¹ Am¹¹ Fmaj7(#4) Dm¹¹ Am¹¹

PIANO SOLO OVER B, LAST TIME TO:

27 Fmaj7(#4) Dm¹¹ Am¹¹ Fmaj7(#4) Dm¹¹ Am¹¹

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31 PIANO ONLY

Musical notation for measures 31-34, piano only. The key signature is one sharp (F#). The right hand features sustained chords: a triad of G4, B4, and D5 in measures 31-32, and a dyad of G4 and B4 in measures 33-34. The left hand plays a continuous eighth-note bass line starting on G3.

35 BUILD IN INTENSITY. GUITAR SOLO TO FINISH

Musical notation for measures 35-39, build in intensity. The key signature is one sharp (F#). The right hand features sustained chords: a triad of G4, B4, and D5 in measures 35-36, and a dyad of G4 and B4 in measures 37-39. The left hand plays a continuous eighth-note bass line starting on G3. Chord symbols are written above the staff: Em7, Bm7, F#m, D, and B.

41 BASS BRINGS IN LINE BASED AROUND THESE NOTES:

Musical notation for measures 41-46, bass line. The key signature is one sharp (F#). The right hand is silent. The left hand plays a line of half notes: G3, A3, B3, C4, D4, and E4.

THE STREAM

ALAN BROWN

$\text{♩} = 79$

PIANO

VIOLIN 1

MP

VIOLIN 2

MP

VIOLONCELLO

MP

5

2

10 $\text{Dbmaj7}(\sharp 4)$ $\text{Eb}_{\text{m}11}$ $\text{Gm}7(\flat 6)$ Bb/Ab $\text{Dbmaj7}(\sharp 4)$ $\text{Eb}_{\text{m}11}$ $\text{Gm}7(\flat 6)$ Ab $\text{Dbmaj7}(\sharp 4)$ $\text{Eb}_{\text{m}11}$

The first system of music (measures 10-14) is a piano accompaniment. It features a treble staff with a key signature of three flats (Bb, Eb, Ab) and a bass staff. The melody is primarily in the treble staff, with chords and bass lines in the bass staff. The second system consists of three empty staves (treble, middle, and bass) for a vocal or soloist part, with a key signature of three flats.

15 $\text{Gm}7(\flat 6)$ Bb/Ab Fm^9 $\text{Dbmaj7}(\sharp 4)$ $\text{Eb}_{\text{m}11}$ $\text{Gm}7(\flat 6)$ Bb/Ab

The second system of music (measures 15-19) continues the piano accompaniment. It features a treble staff with a key signature of three flats (Bb, Eb, Ab) and a bass staff. The melody is primarily in the treble staff, with chords and bass lines in the bass staff. The second system consists of three empty staves (treble, middle, and bass) for a vocal or soloist part, with a key signature of three flats. In measure 18, the word "EXPRESSIVO" is written above the bass staff, indicating a change in performance style.

20 $\text{Dbmaj7}(\sharp 4)$ Eb_{m11} $\text{Gm7}(\flat 6)$ Ab $\text{Dbmaj7}(\sharp 4)$ Eb_{m11} $\text{Gm7}(\flat 6)$ Bb/Ab Fm^9

25 $\text{Dbmaj7}(\sharp 4)$ Eb_{m11} $\text{Gm7}(\flat 6)$ Bb/Ab $\text{Dbmaj7}(\sharp 4)$ Eb_{m11}

EXPRESSIVO

4

29 $Gm7(b6)$ Ab $Dbmaj7(\sharp 4)$ Ebm^{11} $Gm7(b6)$ Bb/Ab Fm^9

PIANO SOLO

34 $Dbmaj7(\sharp 4)$ Ebm^{11} $Gm7(b6)$ Bb/Ab $Dbmaj7(\sharp 4)$ Ebm^{11} $Gm7(b6)$ Ab $Dbmaj7(\sharp 4)$ Ebm^{11} $Gm7(b6)$ Bb/Ab

40 Fm^9 $D\flat maj7(\sharp 4)$ $E\flat m^{11}$ $Gm7(\flat 6)$ $B\flat/A\flat$ $D\flat maj7(\sharp 4)$ $E\flat m^{11}$ $Gm7(\flat 6)$ $A\flat$

The score for measures 40-45 shows a piano part with rests and a guitar part with diagonal lines. The key signature has three flats (F major). The chords listed above the staff are: Fm^9 , $D\flat maj7(\sharp 4)$, $E\flat m^{11}$, $Gm7(\flat 6)$, $B\flat/A\flat$, $D\flat maj7(\sharp 4)$, $E\flat m^{11}$, $Gm7(\flat 6)$, and $A\flat$.

46 $D\flat maj7(\sharp 4)$ $E\flat m^{11}$ $Gm7(\flat 6)$ $B\flat/A\flat$ Fm^9 $D\flat maj7(\sharp 4)$ $E\flat m^{11}$ $Gm7(\flat 6)$ $B\flat/A\flat$

The score for measures 46-51 shows a piano part with rests in measures 46-50 and musical notation in measure 51. The guitar part has diagonal lines in measures 46-50. The key signature has three flats (F major). The chords listed above the staff are: $D\flat maj7(\sharp 4)$, $E\flat m^{11}$, $Gm7(\flat 6)$, $B\flat/A\flat$, Fm^9 , $D\flat maj7(\sharp 4)$, $E\flat m^{11}$, $Gm7(\flat 6)$, and $B\flat/A\flat$. The dynamic marking *MP* is present in measure 51.

6

52 D^b maj7(#4) E^b m¹¹ G^m7(b6) A^b D^b maj7(#4) E^b m¹¹ G^m7(b6) B^b/A^b F^m9

52 D^b maj7(#4) E^b m¹¹ G^m7(b6) A^b D^b maj7(#4) E^b m¹¹ G^m7(b6) B^b/A^b F^m9

58 D^b maj7(#4) E^b m¹¹ G^m7(b6) B^b/A^b D^b maj7(#4) E^b m¹¹ G^m7(b6) A^b D^b maj7(#4) E^b m¹¹ G^m7(b6) B^b/A^b

58 D^b maj7(#4) E^b m¹¹ G^m7(b6) B^b/A^b D^b maj7(#4) E^b m¹¹ G^m7(b6) A^b D^b maj7(#4) E^b m¹¹ G^m7(b6) B^b/A^b

64 Fm^9 g^{maj7} Cm^7 Ab^{maj7} Fm^7 Eb/G 7

Measure 64: Grand staff with slash marks in both staves.

Measure 65: Grand staff with a whole note chord in the treble and bass staves.

Measures 66-69: Empty grand staves.

70 Cm^7 Ab^{maj7} Fm^7 Eb/G Cm^7 Ab^{maj7} Fm^7 Eb/G $Db^{maj7}(\sharp 4)$

Measure 70: Grand staff with slash marks in both staves.

Measures 71-75: Empty grand staves.

8

76 Cm7 Abmaj7 Fm7 Eb/G Cm7 Abmaj7 Fm7 Eb/G Cm7 Abmaj7 Fm7 Eb/G

EXPRESSIVO

82 Dbmaj7(#4) Cm7 Abmaj7 Fm7 Eb/G Cm7 Abmaj7 Fm7 Eb/G

EXPRESSIVO

88 Cm7 Abmaj7 Fm7 Eb/G Dbmaj7(4) Cm7 Abmaj7

MF

MF

MF

93 Fm7 Eb/G Cm7 Abmaj7 Fm7 Eb/G Cm7 Abmaj7 Fm7 Eb/G

MF

MF

10

98 $\text{Dbmaj7}(\sharp 4)$ $\text{Dbmaj7}(\sharp 4)$ $\text{Eb}^{\text{m}11}$ $\text{Gm7}(\flat 6)$ Bb/Ab $\text{Dbmaj7}(\sharp 4)$ $\text{Eb}^{\text{m}11}$

Measures 98-102. Measure 98: Treble clef, whole note chord; Bass clef, whole rest. Measures 99-102: Treble and bass staves with various chords and melodic lines. A double bar line is at the end of measure 102.

103 $\text{Gm7}(\flat 6)$ Ab $\text{Dbmaj7}(\sharp 4)$ $\text{Eb}^{\text{m}11}$ $\text{Gm7}(\flat 6)$ Bb/Ab Fm^9

Measures 103-107. Measure 103: Treble clef, whole note chord; Bass clef, whole note chord. Measures 104-107: Treble and bass staves with various chords and melodic lines. A double bar line is at the end of measure 107.

108 $F\sharp maj7(\sharp 4)$ $E\flat_9$ $G maj7(\sharp 4)$ Dm^{11} $B\flat maj7(\sharp 4)$

MP

GRAD. CRESC.

MP

GRAD. CRESC.

MP

GRAD. CRESC.

MP

110 $F\sharp maj7(\sharp 4)$ $E\flat_9$ $G maj7(\sharp 4)$ Dm^{11} $B\flat maj7(\sharp 4)$

112 F#maj7(#4) E% Gmaj7(#4) Dm¹¹ Bbmaj7(#4)

114 F#maj7(#4) E% Gmaj7(#4) Dm¹¹ Bbmaj7(#4)

BEYOND WORDS

♩ = 89

A

ALAN BROWN

RUBATO

Abm7

Eb/F

Amaj7(#4)

Em(maj9)

Ebm11

Gmaj7(#4)

1.

F#m7

Db7ALT.



REPEAT A FOR PIANO SOLO



LAST TIME REPEAT TILL CUE TO B



B



28 TRUMPET SOLO E_m^9 D G^{maj7} $C^{maj7}(\sharp 4)$ 1 - 5

VLN. 1 TRUMPET SOLO 1 - 5

VLN. 2 TRUMPET SOLO 1 - 5

VC. TRUMPET SOLO 1 - 5

6 Abm^7

PIANO SOLO TILL CUE

VLN. 1 6 Abm^7 PIANO SOLO TILL CUE

VLN. 2 6 Abm^7 PIANO SOLO TILL CUE

VC. 6 Abm^7 PIANO SOLO TILL CUE

PIANO & BASS Am^7 Abm^7 Cm^7

Fm^{11} $G7(\flat 9 \text{ SUS } 4)$ $D\flat^{maj7}(\sharp 4)$ $E\flat(\text{add } 9)/C$ $E\flat(\text{add } 9)/G$

3 2

GUITAR SOLO

DRUMS IN Am^7 Abm^7 Cm^7

Fm^{11} $G7(b9SUS4)$ $Dbmaj7(\sharp 4)$ $Eb(ads)/C$ $Eb(ads)/G$ ³

2

Am^7 Abm^7 Cm^7

Fm^{11} $G7(b9SUS4)$ $Dbmaj7(\sharp 4)$

TRUMPET SOLO
 Em^9 D $Gmaj7$ $Cmaj7(\sharp 4)$

Em^9 D $Gmaj7$ $Cmaj7(\sharp 4)$

GUITAR SOLO
 Am^7 Abm^7 Cm^7 Fm^{11} $G7(b9SUS4)$

MP AT START, GRAD CRESC ON REPEATS

VLN. 1

MP AT START, GRAD CRESC ON REPEATS

VLN. 2

MP AT START, GRAD CRESC ON REPEATS

VC.

$\text{D}\flat\text{maj}7(\sharp 4)$ $\text{E}\flat(\text{add}\flat)/\text{C}$ $\text{E}\flat(\text{add}\flat)/\text{G}$ $\text{A}\text{m}7$ $\text{A}\flat\text{m}7$ $\text{C}\text{m}7$ Fm^{11}

VLN. 1
 VLN. 2
 VC.

$\text{G}7(\flat 9 \text{ SUS} 4)$ $\text{D}\flat\text{maj}7(\sharp 4)$ TRUMPET SOLO Em^9 D

VLN. 1
 VLN. 2
 VC.

$\text{G}\text{maj}7$ $\text{C}\text{maj}7(\sharp 4)$ Em^9

VLN. 1
 VLN. 2
 VC.

REPEAT UNTIL CUE. LAST TIME TO CODA 5

D Gmaj7 Cmaj7(#4)

VLN. 1 REPEAT UNTIL CUE. LAST TIME TO CODA

VLN. 2 REPEAT UNTIL CUE. LAST TIME TO CODA

VC. REPEAT UNTIL CUE. LAST TIME TO CODA

RUBATO

Abm7 Abm7 Eb/F Amaj7(#4) Em(maj9) Ebm11 Gmaj7(#4)

VLN. 1

VLN. 2

VC.

TEMPORAL

ALAN BROWN

♩ = 136

D/G Cm7 Fm7 Ebmaj13 D/G Cm7 Fm7 Ebmaj13

A

7 Ebmaj7(#4) Dm11 Bm11 G/F G/F# Abm11

14 Am/Bb F/Db

B

21 D/G Cm7 Fm7 Ebmaj13 D/G Cm7 Fm7 Ebmaj13

PIANO SOLO OVER A CUE TO B, TO CODA ON REPEAT

TRUMPET SOLO

27 D/G Cm7 Bm7 G/F D/G Cm7 Fm7 Ebmaj13

CUE TO A HEAD X2 TO FINISH