# Snare Drum Composition

Traditions, Concepts, and Approaches

Jonathan Curtis

# I. Introduction

**One** of the most interesting questions that can be asked of a composer is as to the origins of their work's musical content; from where do the ideas, themes, figures, and phrases come, and how were they derived?

To answer this question, the composer must consider their own conceptual positions as to the instrument for which they write. Consider a painter faced with a blank canvas and a newly signed commission asking for a painting of a landscape. The painter must make a wealth of decisions before even a brush can be lifted, many of which take their cue from the conceptual foundations from which the painter paints.

For instance, some painters attempt to recreate a scene – the landscape – as accurately as possible, capturing the exact colours of the sun's light as it hits the leaves on the trees, down to the type of brush or implement used to create a bark-like texture on the trunks. Another painter may seek to capture the *essence* of a landscape as it appears as an *ideal*, or choose to represent this ideal as an abstract of a landscape. A painter could further reference the irony of painting abstract landscapes by abstracting to a greater degree, and suddenly we have fallen down the rabbit warren of postmodernism.

The point is that in art, as in music, total creative freedom is rarely simple in its execution. Far simpler are works with a predefined goal and limitations; our commissioned artist may have been requested to paint a *particular* landscape at a *particular* time of day and in a *particular* season, capturing the specific atmosphere and details at the behest of the client. This removes many of the painter's creative dilemmas and tasks them simply with applying their skills to the task's completion.

Likewise, a composer who is commissioned to write a particular piece in a particular style to fulfil particular criteria can go about their work with little heed to the creative alternatives. But the composer who seeks to write without such criteria is faced with the same decisions as the painter before a blank canvas.

The snare drum is in many respects a simple instrument. It comprises a single voice, devoid of tonal or harmonic elements, meaning its performance and musical nuance fall solely on the twinned tenets of rhythm and dynamics. Where a pianist can employ harmonic device to conjure suspense, or joy, or tension and resolution, the snare drummer must draw on rhythmic and dynamic principles only. On the one hand, we may choose to see this as a hindrance. Alternatively, like a person who has lost their sight only to feel their others grow keener, we could choose to see the snare drum as an instrument possessing a certain clarity of focus; without the *distraction* of harmonic devices, the purity of the rhythmic elements can be brought to the fore.

Regardless, the fact remains that snare drum compositions must rely on their rhythmic and dynamic elements. As composers, therefore, we must endeavour to apply them as deftly and skilfully as possible to keep the snare drum as a solo instrument musically relevant and, dare we say it, enjoyable to listen to.

There are many methods to derive a rhythmic figure, using all kinds of methodologies ranging from algorithms and structured cycles, right through to the rolling of dice, but none of these guarantee a composition that *sounds good*.

There is the question, of course, as to whether a composition *should* sound good, but again we risk a headlong plunge into postmodernism where everything is doubted an art itself is under threat. Whilst this detour is certainly waiting impatiently in our periphery, is not the goal of this paper.

We come then to the crux of the question at the heart of this essay: how do we write for the snare drum? To quote a good friend of mine, a good first step is to "consult the existing literature." In so doing, we unsurprisingly find a vast array of material with wildly different conceptual approaches. In Delécluse we find études with intentionally little direction, often quoting the orchestral repertoire, allowing for great interpretation on the part of the performer. Rhythmic passages are quoted and reprised, displaced and syncopated, taking the listener on a gradual abstraction of thematic development, imbued with subtleties of performance in the shape of short buzz rolls, intricate rhythms, and a certain texture typical of the orchestral style.

In Pratt, in almost complete departure, simple, often accented rhythmic figures are proudly phrased as rudimental combinations, harking back to the military traditions from whence it came. While there will always be space for interpretation by the performer, these rudimental solos often give plentiful instruction, from stickings for every single stroke, down to which rudiment is being used and on which part of the head or rim it is to be played. A Pratt solo is founded on rudimental principles, and proudly so.

Then there are the composers who draw influence from less common sources. Becker's *Mudra* is accompanied by a Hindustani pitch matrix and is derived from a far larger concert suite, originally intended to accompany choreographed dance. His *Lahara* is to be performed with a cyclic melody and drone, and marries the military roots of rudimental drumming with the more rhythmically exploratory approach espoused in his seminal *Rudimental Arithmetic*. Interestingly, while in no way speaking disparagingly, Becker himself states that the more technically intricate pieces, from his own pieces to those of Delécluse, are "unlikely to be understood or appreciated by the general public." [1]

Tompkins' *French-American* solos present a wonderful amalgamation of two disparate yet fundamentally linked traditions. Throughout three volumes (to date), Tompkins explores the relationship between the strong, resolute American vocabulary and the intricate, flowing elegance of the French, all the while drawing on a love of jazz which creates as "sense of swing or lilt" in his solos.[2]

Recent developments have seen the abstraction of snare drum vocabulary placed alongside electronic sampling in Akiho's *Stop Speaking*, while America's Drum Corps International continue to push the bounds of what is physically possible with a pair of sticks and a snare drum.

All of this serves to demonstrate that, despite its apparent shortcomings, the snare drum provides ample opportunity to the composer and performer, though it does seem that its music broadly falls into either the rudimental or the orchestral camps, if not a little of both.

## II. Deriving Content

Composers, whether writing for snare drum or anything else, must on some level contend with the philosophical questions at the heart of the craft, ultimately leading towards the issue of where they derive their musical content.

Bob Becker, a prolific composers and master drummer, has created a compositional legacy based on an evolving and holistic body of work. Regarding his own approach, he writes:

> "*I approach composition from a developmental perspective, in that each new piece is informed by the materials, structure and orchestration of the previous ones, and often directly influenced by the most recent work. I won't accept a commission if the proposed piece can't conform to the direction in which my work is going. For nearly 30 years I*

[1] (Curtis, 2020)
[2] (Tompkins, Email Conversation, 2021)

*have been exploring, rather narrowly, a pitch-matrix derived from a specific Hindustani raga. The material first appeared in a latent way in my piece Mudra, and has become increasingly defined in later compositions."*[3]

This speaks of a longer term commitment to a conceptual idea or philosophical framework which serves to inform much of what the composers writes, and in turn informs what will be written subsequently.

*"A composer is an explorer – someone who goes off alone to remote, difficult, sometimes dangerous places, and takes risks to bring back something new and amazing to everyone back home… a composer's function is to create an account of his or her own imagination in a comprehensible form – that is, in an explicit notation or medium."*[4]

Here, Becker is talking within a context aimed at distinguishing the *composer* from the *performer*, but it nevertheless reveals an interesting point as to the composer's *function*, and indeed, this function can directly inform the composer in terms of the content they ultimately produce. With a strong idea of one's conceptual starting place, a composer can look to fill their musical content with ideas that align with that place. Becker goes on to say that all of his pieces were "written using the vocabulary of the North American rudimental tradition."[5] This vocabulary is applied in such a way that aligns with Becker's conceptual starting point, that which he has spent his entire career developing and refining.

Becker is also not the only snare drum composer to write in this way. Tompkins, as previously mentioned, has a series of renowned works based on the fusion of French and American rudimental vocabulary. The contrasting nature of these traditions and their juxtaposition within a piece provide a philosophical framework for Tompkins' work, within which he can apply his vocabulary in complementary way.

Tompkins states that he writes with a particular technique or vocabularic idea in mind.[6] Having discovered the French rudimental ideas of Raynaud and especially Lefevre, Tompkins developed compositions based specifically on them. For instance, his very first piece in this capacity, *I* from Volume 1 of his work, is built around the concept of embedded rhythms, examples of which are taken directly from Lefevre's method book. Here is a great example of the philosophical framework directly informing the content of a new composition. Tompkins' concept seeks to explore the juxtaposition of two contrasting traditions, and the embedded rhythms espoused in Lefevre are often immediately followed by an instance of the American tradition. In Tompkins' own words, the unfamiliar, abstracted rhythms of the French tradition are immediately grounded by the more familiar American vocabulary, and this idea informs a large portion of his compositional content.[7]

The American rudimental tradition itself provides a deep and familiar vocabulary for composers, the most prominent of which is likely John Pratt. Pratt's works number in the hundreds over the course of a near-50 year career, and masterfully utilise American rudimental vocabulary to create strong, recognisable and, in some cases, iconic pieces. Speaking of Pratt, Becker states:

*"Pratt approached the rudimental drum solo in significantly new ways. Before him, rudimental solos tended to be relatively short, repetitive, and with mostly straight-forward symmetrical phrasing… Pratt substantially expanded the solo format, increasing its length and introducing more elaborate formal structures. Although his pieces always are based in traditional rudimental practice, often with each specific rudiment named and identified in accompanying notes, he uses principles of development and motivic construction far more freely than previous composers had attempted. Some of his later works even convey quasi-narrative structures."*[8]

In Pratt, then, we find another compositional career dedicated to the development and refinement of a conceptual ideal. Pratt's work takes the rudimental vocabulary as his source material, and applies more sophisticated compositional ideas – as Becker states, more elaborate formal structures and an unrestricted motivic construction – to create pieces now seen idiosyncratically with his voice as a player and composer.

---

[3] (Curtis, 2020)
[4] (Becker, Finding a Voice, 2016), p. 162
[5] (Curtis, 2020)
[6] (Tompkins, Consultation Session, 2021)
[7] (Tompkins, Consultation Session, 2021)
[8] (Curtis, 2020)

Indeed, Pratt can claim a significant role in the history of the American rudimental vocabulary, having founded the International Association of Traditional Drummers (IATD) in 2004.

This organisation's role was to preserve the tradition of the American rudimental drumming vocabulary. In terms of this traditional vocabulary, Pratt states:

> "…it's always fresh; it has timeless technical benefits for a drummer's control and development, especially of the left hand, and it has great musical value in its unique technical phrasing with its rudimental constructions and accents."[9]

This history of this period of American rudimental drumming is certainly interesting, but its details are beyond the scope of this paper. However, here again is a clear example of a celebrated snare drum composer with a body of work born from a commitment to a conceptual basis and accompanying vocabularic ideas. Pratt's answer to our original question is a simple one: From where is Pratt's musical content derived? From American rudimental vocabulary; the vocabulary informs the content, which further informs the formal structure of the pieces themselves.

# III. Case Study: Tompkins and the French-American Juxtaposition

Joseph Tompkins is a renowned percussionist and composer, having performed with the New York Philharmonic, the Metropolitan Opera Orchestra, and the Cleveland Orchestra. While his teaching, performing, and compositional career is varied and diverse, he first came to my attention through his French-American snare drum solos, which are of interest to this paper.

Speaking of his compositional approach, Tompkins states:

> "Generally, my compositional approach is built around combinations of American and French concepts with a sense of style probably more closely tied to jazz (in that each piece usually has a sense of swing or a lilt, and develops from my own improvisations). When I think of American drumming traditions, I place jazz drummers at the top. Rudimental drumming is wonderful for technique, but I find the expression of jazz drumming to be most captivating. The spontaneity and energy of the great jazz drummers has, I hope, influenced my writing. Each piece has unique source material, however, and not all are jazz influenced. I will say that much can be lost when pencil meets paper, and the challenge is to compose without "distilling" the ideas down to the point of a mundane exercise.
>
> Stylistically, the French and American traditions work well together, in my opinion, because they are so different. The French repertoire, passed down for generations through an aural tradition for centuries, is far more intricate (Le Coup de Charge being one example) than the American repertoire. There are a variety of reasons for this, many being hypothetical. Function (in a military setting) limited the complexity of British drumming traditions, and this was inherited in the American setting. Swiss influences on the French are of great influence. And there are other possible explanations for the vastly different trajectories of these two styles.
>
> Compositionally, I find that the less familiar French concepts provide tension in my music and, generally, American rudimental concepts provide the release (this is an over simplification, of course, but generally holds)." [10]

This is a fascinating passage which reveals a number of important points. Here we see a commitment to a particular idea, namely the juxtaposition of French and American vocabulary, underlined by a love of the *lilt* and *swing* of jazz expression. This conceptual foundation can directly inform the content of the piece whilst being recognisable as Tompkins' own work. To explore this, we can study parts of Tompkins' works to see this application *in situ*.

We begin with I. from Tompkins' *Volume 2* [11]. This piece in the time signature of **2/4**, has a stately suggested tempo of 60 beats per minute. This slow tempo is a feature Tompkins favours due to the space it provides;

---

[9] (Pratt, 2004)
[10] (Tompkins, Email Conversation, 2021)
[11] (Tompkins, Nine French-American Rudimental Solos Volume 2, 2011)

it allows for rhythmic complexity and the use of dense, faster passages, framed within a more spacious context, unrushed by a racing tempo.[12] This tempo certainly portends the rhythmic complexity that follows. The first three bars run thus:



Fig. 3.1 [13]

Tompkins' compositions are known for their long, flowing rhythmic lines, and this is evident here. His tendency to begin a phrase with a French idea and immediately follow it with an American one is immediately apparent, building on his concept that French vocabulary lifts or propels a figure whilst American vocabulary grounds it.[14] With this idea in mind, Tompkins writes:

> "*Sometimes I will find a new idea (in the French repertoire), and play it for hours and hours… and then just see how it worms its way into a piece. Other times I will… try variations of it against American ideas.*" [15]

Here, we see the marrying of French and American ideas occurring at the developmental level, before the process of composition actually begins. French ideas are internalised, and part of this process is in trying them *against* (in contrast to, paired with) American ideas.

In Fig. 3.1, we begin with a 16th note septuplet with 32nd notes nested within. These 32nd notes are directly inspired by the French *frisé détaillé*, or open single strokes. This technique and its application is found in Lefèvre's *Supérieure*[16], and was a source of direct influence on Tompkins' work.[17] This intricate tuplet figure is immediately followed by the 8th and 16th note flam figure of the next two beats. This flam figure is reminiscent of Pratt or Wilcoxon, with a strong, simple rhythm and a flammed accent at the end of the phrase.

The line continues within another flourishing 32nd note figure, beginning with another French *frisé* leading into 32nd note quintuplet. The line then reprises the 8th and 16th note figure to finish. If this line were to be written in 3/4 time, it would occupy two bars, both of which began with a *French beat*, followed by two *American beats*. This gives the whole phrase a degree of symmetry or balance, in which the French vocabulary propels the line, which is grounded or concluded by the American.



Fig. 3.2 [18]

In the above figure, taken from Tompkins' V. from the same volume, a similar pattern is present. This time, the French stroke known as *Le Coup de Charge*, or inverted flam, appears twice in the opening septuplet.

[12] (Tompkins, Consultation Session, 2021)
[13] (Tompkins, Nine French-American Rudimental Solos Volume 2, 2011), p. 1, bars 1 and 2
[14] (Tompkins, Consultation Session, 2021)
[15] (Tompkins, Email Conversation, 2021)
[16] (Lefèvre, 1987)
[17] (Tompkins, Consultation Session, 2021)
[18] (Tompkins, Nine French-American Rudimental Solos Volume 2, 2011), p. 10, bar 15

This is a renowned piece of French vocabulary, again presented to a wider audience in *Lefèvre*, which places an accent on the first note of a flam within a figure. This serves as a rhythmic *kick* or *jump* within a rhythm, and can be placed within larger rhythmic figures in a similar way to the more standard flam. In this bar, once again, intricate *French* figures are immediately grounded by an American rudimental figure which voices a flamacue.

These figures provide only a small snapshot of the solos as a whole, but serve to illustrate one of the conceptual foundations on which they are built. The figures in isolation do not show the expressive, flowing macro rhythm inspired by Tompkins' love of jazz expression, and indeed this would be much harder to analyse in an isolated figure in this way. Nevertheless, with Tompkins' own words firmly in mind, his French-American pieces make sense; more sense than they perhaps otherwise would to the student attempting them without their knowing background or context.

# IV. Systemic Composition in My Own Work

I have been exploring the concepts of systemic composition in terms of both a piece's structure and its vocabularic content since the beginning of this project. It raises as many interesting philosophical questions as it does musical ideas and opportunities.

By systemic composition, I am referring to composition in which various elements are defined or derived from following some process or system. This system may be mathematical or numeric, based on chance or randomness (as in aleatoricism), based on algorithmic or formulaic devices, or any other idea which can be translated into musical language.

As an artistic concept, this approach often describes work derived from uncertain elements. This can take the form of chance, apparent randomness, or interpretation on the part of the performer or artist. Mozart, for example, was known to allow the order of musical measures within a passage to be determined by the throwing of dice.

As evidenced by this very paper, I am interested by how composers can derive their musical content, and the aesthetic implications involved in their writing. Having explored the mathematical applications espoused by Becker in his inspirational *Rudimental Arithmetic*, I began exploring systemic approaches to deriving musical structure, and latterly began applying the same or similar processes in phrase and figure construction.

I like to work with structure, creating an overall *shape* of a work, which can then be whittled down, embellished, and sculpted to completion. I find inspiration flows most freely when working with a broad idea on material that is already present, as opposed to attempting to create an idea from nothing. To this end, creating a structure first allowed most of my compositions to take place within a focused and pre-established framework. This developed to become a philosophical concept underlying much of my compositional work.

In exploring various metric and mathematical structures across various areas of art, history, and culture, I was perhaps most drawn to the intricate structured paths of Vedic chant. The history of this is fascinating, but far beyond the scope of this paper. Briefly, Hindu religious texts called Vedas are learned and passed on orally. Due to their importance within Hinduism, great care is taken to ensure their correct and accurate recitation. To this end, various *pathas* or paths exist to aid in memorising passages, each outlining a recitation style to be applied to words, sentences, and paragraphs.

There are eleven paths of various complexities, and all outline methods of reciting a body of text or words in such a way as to retain grammar, pronunciation, and the Vedic pitch accents of the original Sanskrit. On a very simple level, the paths outline a numerical sequence that is applied to a given sentence. Each word in a sentence is numbered, and the chosen path dictates the order in which each word is read. The path known as *jata*,[19] for example, takes pairs of words and places them forwards, backwards, and forwards again.

---

[19] ಜಟ ಜಂ

The first sequence of jata runs 12-21-12, where the first and second words of the sentence are read in that order. This then progresses to the second and third words of the sentence, read in the same sequence: 23-32-23. These sequences, when applied to the Vedic chants, contain all aspects of their recitation, including pauses, accent, pronunciation, grammar, and syntax, but we can already see how these paths can provide interesting rhythmic and metric structures.
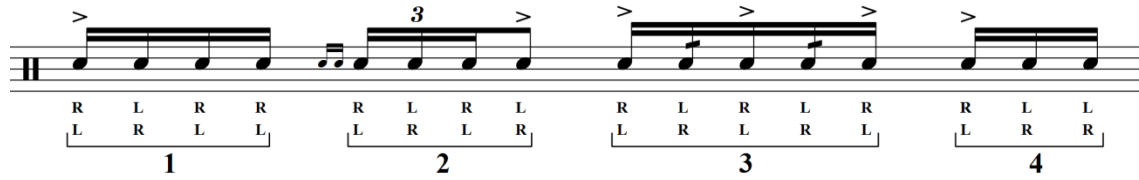
Fig. 4.1

In the above figure, four rhythmic *words* exist within a measure, each numbered sequentially. We can formulate a rough musical structure by applying the Vedic path sequences, creating a compositional section from each sequence.
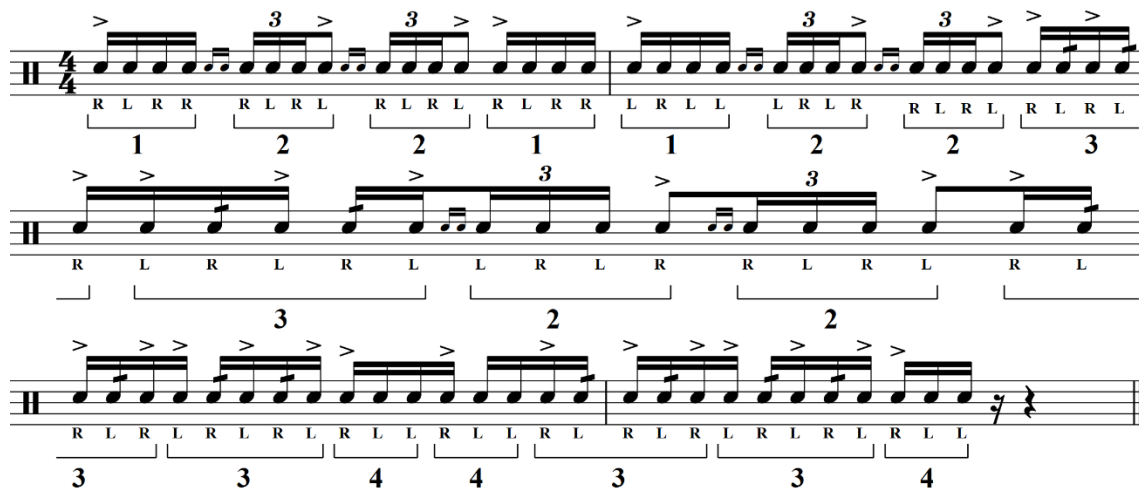
Fig. 4.2

In the above figure, the first three sequences of jata have been applied[20] to create a five-bar phrase. The original words have been placed within a 4/4 meter and the relevant sticking applied to retain rudimental cohesion.

This very simple example serves to demonstrate how a musical form can be derived using some structure or sequence to arrange rhythmic figures. Of course, the choice of the individual rudimental vocabulary is largely arbitrary for this example, but in so using arbitrary starting figures, we need not be limited by them.

---

[20] 122112. 233223. 344334

Fig. 4.3

In the above example, the rhythmic figure of each bar is taken directly from the position of the accents in Fig. 4.2. The accent of each bar is converted in an unaccented note and given a note value most legible within a 4/4 meter. We have now arrived at a truly aleatoric passage of music in which the position of each note in the rhythms of Fig. 4.3 is derived from aleatoric principles. It would be inaccurate to label this passage as *random*, but an element of chance devoid of any agency on the part of the composer is at work. Fig. 4.3 represents a starting point from which composition can begin.
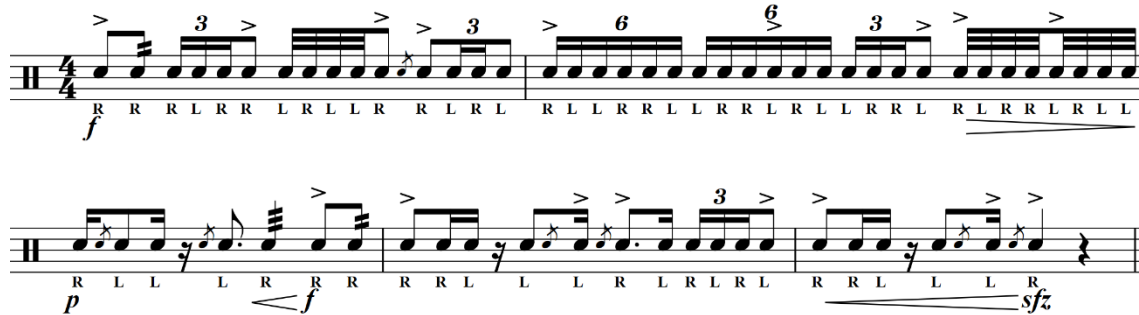


Fig. 4.4

The above passage shows how the aleatorically derived ideas from Fig. 4.3 can be adapted into more meaningful musical content. In this example, many of the notes from Fig. 4.3 have become accents, acting as destination points, between which rhythmic ideas can flow. In the first bar of Fig. 4.4, each accent represents one of the derived notes from Fig. 4.3, with rudimental vocabulary and simple rhythmic figures acting as a path between them. In this example, I have been quite liberal with my use of rhythmic and rudimental figures; the intent is to demonstrate how an aleatoric *element* can lead to a foundation on which composition can be built. There need not be a commitment to aleatoricism *ad nauseam*; it can be used as a starting point to develop coherent musical phrasing or structure, to be adorned and completed at the discretion of the composer.

Furthermore, using linked aleatoric devices such as the Vedic paths across numerous works can create an overarching cohesion or concept unique to the composer, as opposed to a collection of disparate works with the same composer's name written on them.

Presenting the derived passage from Fig. 4.2 can be used as a starting theme, to be developed in a way similar to Fig. 4.4. While it is unlikely that a first-time listener would pick up on the link, there is nevertheless a coherence and continuity between Figs. 4.2 and 4.4 that is innately pleasing. Conceptualising 4.4 as a motivic development from 4.2 allows for a linking together of the aleatoric theory at the heart of it. It falls to the composer to decide the degree to which the aleatoric elements dictate the content, but it can provide an interesting exploration of structure and figure which would otherwise be unapparent to the composer.

We can turn to numerical sources to explore further aleatoric possibilities. In *Rudimental Arithmetic*, Becker asks:

> *"What does arithmetic have to do with snare drum rudiments? What does mathematics have to do with rhythm?"*
> [21]

The answer to both of these questions, of course, is *quite a lot*, though the full extent of this is not always clear. Becker explores the relationships and roles of numbers in the rudimental drumming tradition. Exploring concepts such as rhythmic densities, polyrhythms, partitions of numbers, permutations, and other mathematical processes, he demonstrates not only their prevalence, implicit or otherwise, in the

---

[21] (Becker, Rudimental Arithmetic, 2008), p. 1

drumming pedagogy, but their value as tools and methods in composition. The non-identical twins of mathematics and rhythm are more alike than first impressions may suggest.

Consider, for example, how a series of numbers can be taken to create rhythmic figures of a given length. Taking *pi* as an example, discounting for a moment the decimal point, we have 3142. Taking these numbers as groups of 16th notes, we can generate the following figure:



Fig. 4.5

The figure above shows this simple figure, with first note of each grouping accented. From this we can easily place it in a musical context to being a process of simple composition:



Fig. 4.6

Here, the figure is played twice, with measured rolls and diddles used for the stickings. We have here seen in the space of a single paragraph how the curious composer can create coherent musical figures from something as seemingly unconnected as the digits of pi. Indeed, a composer wishing to further explore this path could take a longer string of pi, say 3141592, and use this to inform an entire composition. Aside from creating a figure out of these groupings in the same way shown above, they could explore the permutation options of these groupings. Containing seven digits, this figure of groupings has 5040 permutations; that is to say, once they have been converted into 16th note groupings, they can then be arranged in over five thousand unique ways.

Consider now a composer who formed each bar by rolling dice. The number rolled, perhaps, informs the subdivision, or the time signature, or maybe the beat of the bar on which a figure occurs. Dice or similar arbiters could decide the length of the piece, its tempo, any metric modulation or polyrhythmic ratios; the deeper we dive, the easier it is to see how the numerical nature of rhythm lends itself freely to manipulation by mathematical means. When asked whether such compositional processes would have the same validity as music composer by more traditional means,[22] Becker replied simply *yes*.[23]

The use of algorithmic based composition is not particular new. Western counterpoint can be shown to be algorithmically determined, and the use of formal rule sets has been explored by composers for centuries. While such methods are generally becoming more philosophically accepted, especially in the computer age, there is nothing to suggest that such methods produce music that *sounds good*.

Rob Knopper of the New York Metropolitan Orchestra described the tendency towards *popcorn snare drumming* in reference to certain obscure compositions.[24] While spoken jovially, this highlights a real and present danger somewhat unique to the snare drum. Lacking any tonal element, the snare drum and its compositions rely on rhythm and dynamics to express musical ideas. Simply reproducing odd groupings of notes based on certain rules will sound, for all intents and purposes, random (like popcorn popping). The

---

[22] These might include use of tonal or modal harmony, scales, common musical structures, thematic devices, counterpoint, and style-specific idiosyncrasies.
[23] (Curtis, 2020)
[24] (Knopper, 2020)

number-based processes suggested above, especially those involving dice or numerous permutations of groupings, indeed risk the *popcorn effect*.

Of course, seasoned and skilful composers can utilise these techniques in a refined and artful manner without falling into their despotic grasp. Below is an elegant example from Becker:



Fig. 4.7 [25]

Here, a figure of 3-3-2 groupings, phrased with flammed accents, is permutated three ways across three bars. Without including the flam at the end of each figure, these are the only three ways to permutate these particular groupings. In context, this passage follows a section of similarly voiced flam figures, and leads into the next section smoothly. Here, Becker has utilised permutation as tool without sacrificing the musical coherence of the material.

## Dekatría

*Dekatría* is a composition that I developed over many months which utilises and explores mathematical systems and numerical relationships and their role in composition. It strives to strike a balance between a conceptual exploration of aleatoricism and musical coherence.

On the one hand, numerical devices are employed to derive many elements of the compositional structure and the contents therein; on the other, the resultant material is adjusted and manipulated to retain a pleasing musical character. While it does not intend to provide any definite or authoritative answers, it certainly asks the questions of the extent mathematical devices can be used in composition, and whether they can be made to sound good on a snare drum.

The composition is based on the eponymous number, and utilises key mathematical characteristics to derive various aspects of its content. Unfortunately, due to a technical fault, my annotations of every single process utilised have been lost, though I can recall the key elements.[26]

Firstly, I devised an overall structure. Taking 13 8th notes as a starting point, we can divide this into a string of 26 16th notes. To create a musical figure, I turned to the partitions of the number 26 itself. We cannot derive the number 26 from odd numbers alone, but beginning with the number 2, we can arrive at 26 by adding the subsequent odd numbers sequentially: $2 + 3 + 5 + 7 + 9 = 26$.[27] This gave me a preliminary figure consisting of 2, 3, 5, 7, and 9 16th note groupings.

Next, I created two primary figures based on permutations of these groupings, which I labelled **A** and **B**. Figure **A** runs 92735, and figure **B** runs 39752. The sequence for **A** was generated by beginning with the highest number (9) and pairing it with the lowest number (2), and then repeating this with the remaining numbers (7-3, with 5 left over). **B** was then created by placing the numbers in pairs that do not appear in **A**. In other words, the pairs in **A** were separated in **B**.

---

[25] (Becker, Rudimental Arithmetic, 2008), Etude 1 "Honourable Discharge", p. 149

[26] With a view to writing this paper, I documented every single aleatoric device that I employed in the writing of this piece. That makes it all the more frustrating that that document was lost before I was able to write this paper.

[27] Working with odd numbered partitions was an idea learned from Becker's own research.

Fig. 4.8

The above figure shows each figure at this stage. Each figure is 13 8th notes in length, derived from permutations of the odd-numbered partitions of the number 26 sequentially added to number 2.

Next, I turned to integer group partitions of the number 13 comprising just the numbers 2 and 3, of which there are 16 possibilities, and chose the most interesting one.[28] This was 3+3+2+3+2. I used this to order the **A** and **B** figures to create a master phrase, which runs: ABB ABB AB ABB AB, following the integer group chosen. The ordering here is again arbitrary. For the groups of 3, I could have used AAA, BBA, ABA, or any other permutation. Instead, I decided to mimic the way such groups might be played rudimentally, with the right hand playing the accents of the grouping (A) and the left hand filling in the gaps (B).

What follows is a wonderful example of the nature of mathematics producing something beautiful. To begin with, I placed this master phrase in a **4/4** time signature. Each A or B figure contains 26 notes. One complete cycled of the master phrase contains 13 instances of a figure, giving us 338 notes in total for one instance of the master phrase. This number does not wholly divide by 4, such that one instance of the master phrase finished on the second 16th note of the 22nd bar.

If another instance of the master phrase is added, beginning on the very next 16th note, it ends on the fourth 16th note of the 40th bar. If more repetitions are added again and again until the last note of the entire master phrase aligns with the last 16th note of a bar, we find that we must repeat it eight times. This gives us a total of 2704 16th notes, which neatly divides by 4 to create 676 quarter notes. This is not initially remarkable, until we explore what this gives us in the time signature of **4/4**. 676 quarter notes divides into 169 bars of **4/4**, 169 being the square of the number 13. Put simply, the eight repetitions of the master phrase can be divided into thirteen 13-bar sections, equating in a bar length that is the square of the number which started it all.

The 13 sections, each containing 13 bars of **4/4**, run as follows:

1. **ABBABBAB**
2. **ABBAB**ABB
3. ABBAB**ABB**
4. AB**ABBABB**
5. **ABABBAB**A
6. BBABBABA
7. BBAB**ABBA**
8. **BBABABBA**
9. **B**ABBABBA
10. BABBAB**AB**
11. **BABBABAB**
12. **BAB**ABBAB
13. BABABBAB

Each item of the list above represents a 13-bar section in **4/4**, totalling 169 bars. Throughout all 13 sections, the ABB ABB AB ABB AB master phrase runs repeatedly eight times. This is shown in the list by the alternating bold and underlined groupings.

---

[28] This was a wholly arbitrary choice, of course. I looked for a suitable mixture of 2s and 3s that seemed to me the most interesting.

This mathematical symmetry was rather rewarding to discover. It was not by design that the 13 8th note phrases multiply 8 times to create the square of 13 in terms of bars in **4/4**, but rather by exploration. Once discovered, this gave me an overarching structure for the piece, and a starting point for the composition that was mathematically extremely rewarding and, subsequently, compositionally thematic.

As previously stated, the details of the following steps are frustratingly lost in the ether of faulty computers. However, I do know that I made extensive use of the Fibonacci sequence, of which the number 13 is a member. One sequence in particular that I used on numerous occasions was 5, 8, and 13, these three numbers being a section of the Fibonacci sequence. I also made ample use of the numbers 11 and 13 as a pair, being twinned primes with one another. With the main structure outlined above, I used these numbers to add in various embellishments or predetermined phrases. For example, turning every 5th, 8th, and 13th 16th note into a diddle, or adding a flam every 11th and 13th note, or inserting a 5-stroke roll every $x$ 16th notes, $x$ bearing some mathematical relation to the number 13.

These sorts of additions began to give the whole structure an essence of musicality that was at this point entirely aleatorically defined. Suffice it to say that by the time I had completed these sequences, I was left with a large and unruly structure akin to a block of clay that would go on to form a sculpture. My clay block was now roughly the right size and had a vaguely recognisable shape.

I could, of course, have continued in this vein with more and more obscure aleatoric systems to a remarkable degree. With even a cursory understanding of the concepts previously discussed, the sufficiently motivated composer can find a practically endless variety of ways to derive music aleatorically. I could have added a dotted 8th note rest every 169th 16th note, added a 13:8 polyrhythm figure every bar number that appeared in the Fibonacci sequence, and so on and so forth.

As stated from the beginning, however, this concept requires a degree of balance, and we as composers should not feel enthralled to our philosophical frameworks. Computer software can generate far more intricate aleatoric or algorithmic compositions than I, with a degree of accuracy and mathematical beauty that a human could not hope to match. Instead, I strive to treat this with an air of joviality and, of course exploration. Exploring the aleatoric possibilities to various extents is *fun* and *interesting*, and can present ideas for further consideration. It is a canvas on which our craft can be painted, rather than a slate on which the commandments are chiselled.

With this in mind, and in possession of the aforementioned unruly block of clay, I began the process of taking each section and hammering out something musical. I had the position of every accent the piece would include, I had some predetermined rhythmic figures, diddled notes, flams, various tuplets or rudiments; now was the time to mould these ingredients into something that resembles music, and this began a process far more in line with traditional composition; theme, dynamic expression, motivic development, phrasing and repetition, the hallmark tools of the composer.

# Bibliography

Becker, B. (2008). *Rudimental Arithmetic.* New Jersey: Keyboard Percussion Publications.

Becker, B. (2016). Finding a Voice. *The Cambridge Companion to Percussion*, 161-167.

Curtis, J. (2020). *Bob Becker Interview Part 1 - Composition and Technique.* Retrieved October 2020, from https://www.jonathancurtis.co.uk/bobbecker1

Knopper, R. (2020, November 18th). Consultation Session. (J. Curtis, Interviewer)

Lefèvre, G. (1987). *Le Tambour Technique Supérieur.* Paris: Alphonse Leduc Éditions Musicales.

Pratt, J. S. (2004). *History - How the IATD Came to Be.* Retrieved January 2021, from International Association of Traditional Drummers: http://iatdrummers.com/history

Tompkins, J. (2011). *Nine French-American Rudimental Solos Volume 2.* New York: Bachovich Music Publications.

Tompkins, J. (2021, January 19th). Consultation Session. (J. Curtis, Interviewer)

Tompkins, J. (2021, January). Email Conversation. (J. Curtis, Interviewer)