

A Quest for Musical Clarity:
Grounding Compositional Practices in Perception and Gestalt Theories.

or,

Writing Musical Stories on the Metaphysical Level of Perception.

including:

A Mathematical Formulation for Several Functions of Musical Perception.

(V. F - F.F.F.F - F.F)

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To H., F., A., A., G., W., J., I., ...

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Abstract

What are the main theories on sound and musical perception? Is there a possibility for the composer to understand those ideas and use them as the basis for the organization of his craft? Would those be enough to create the musical 'clarity' I am looking for? Finally, can I find a way to formalize any of those theories in my composition practice?

As a starting point for this investigation, part one establishes the philosophical ground for this investigation about clarity, particularly stressing the difference between intention and object, between form and structure, and their complementary nature and interaction with each other, before drawing a first idea on musical perception through the lens of Gestalt theory.

Parts two and three detail the different elements that come into play while applying those ideas into my composition practice. I introduce a list of the parameters that will play a prominent role in the elaboration of the representation of the mathematical formulations seen in part four by developing further my understanding of the theories elaborated by Leonard B. Meyer around the idea of 'expectation' in his book *Emotion and Meaning in Music*, and articulating them from a practical point of view.

The fourth and final part of this investigation exposes a mathematical representation of my thinking on those ideas in order to conceive and use them in my composition practice. This 'model', based on an understanding of what will be referred to as '*motion*', is the ground for the elaboration of the musical shapes in my pieces.

Disclaimer

As a result of my investigation on Gestalt and perception theories, and their application into my work as a composer, I have realized that the small formulation I have developed in the last part of this paper (which I use for guidance in my own practice) could very well be applied to any sort of musical creation.

This formulation is only a way to *represent* the theories discovered during my investigation, and are not in the slightest a sort 'universal formula for composition'... This point must be extremely clear in the reader's mind as to avoid any misunderstanding. My intention has never been, during my work on this paper, to pursue such an illusory goal.

For this part also, I eventually found it a much better idea to not use any musical illustration. That way I intend to let the articulation of the several functions of perception I have investigated happen without a specific type of music in mind. That way also, it could be potentially applicable in any context, for anybody willing to use it.

A QUEST FOR MUSICAL CLARITY

Introduction

Embarking on a quest for musical ‘clarity’ is a lifelong journey that starts as soon as the artist decides to create and communicate emotions and meanings with the world. Those, of course, can rarely be totally grasped, and that is the beauty of art. But creators, still, are looking for the best way to bring to the more-or-less physical world (depending on their art) this ‘message’ that they feel compelled to deliver. They are looking for this holy grail, continuously refining their tools, through which their creative processes happen.

Having arrived at a point in my own practice where I struggled with efficiently structuring my working concepts and converting them into a piece through my craft, I realized that I needed to find new concepts or ideas that could push me in the direction of clarity in my musical discourse. I did not want something that would, in a way, write the music for me, a sort of placid algorithm that I would apply mechanically without really controlling the end result, without letting my creativity and intuition sometimes take over, making me a slave of my own process... not at all. Rather, I wanted to understand how we make sense of the music itself, cognitively, to make things clear not only to me, but also to the audience that will listen to my pieces.

For that part, the feeling and fear of not being understood might be seen as something slightly suspicious among the creative community. Many artists and composers have been able to go beyond this feeling, or maybe some never felt the need to be understood, but this is not so my case. Some could also argue, in a sort of ‘quest for pure originality’, and to some extent rightfully, that we need to overcome this fear in order to create something truly worth sharing.

And of course, there is always the possibility that as clear as we think we can be in delivering our musical thoughts, those might sometimes just be misunderstood.

Here is a fact. According to French sociologist Pierre-Michel Menger¹, despite the fact that 2/3 of the audience of the Ensemble InterContemporain in 1983 (58% in 2008) reported a strong musical instruction and/or musical practice, and that people from artistic, intellectual and academic occupations counted for more than 1/3 of the audience, 3/4 of this same audience found it difficult or very difficult to distinguish between the different aesthetic trends

¹ *Contemporary Music and Its Audience: A Tale of Benevolent Asceticism?* (Springer International Publishing, 2017)

within art music today. Menger also specifies that the « *difficulty to judge and discriminate has different meanings depending on a listener's background and expectations* ».

In the same article, Menger also underlines the « *deeply personal phenomena* » that musical perception is, stating that « *public resistance to artistic innovation is due to the gap between modes of perception required by new artworks and socially dominant forms of decoding for already established artworks* », meaning in knowledge and education, and that eventually, « *individuals appear to be shaped and even 'paralyzed' by their habits, resulting in the most immediate acoustic environment to condition them* ».

Now if the intelligibility of music partly lies in the education and habits of an audience, then creating a link with an audience means here to use their musical perception abilities to speak to their general musical knowledge and cultural background so that it can 'make sense' of what they are listening to. This is a good starting point, however not entirely satisfying. To me, the problem lies in what I have talked about before: this questionable 'quest for pure originality' in the creation of new works, with its accompanying idea of an 'incommunicable fortress to be executed at the cost of the audience'.

Put as a first driving question that I am trying to solve for myself with this investigation: How can I be 'clear' regardless of the content of my work?

My first encounter with this 'clarity' I am looking for in my own compositional practice was through the music of Alexander Scriabin. I remember being totally absorbed by the organization and pacing of sounds that portrayed this metaphysical, mystical world of his. In his works, the author didn't seem to only expose or present his compositions, but rather to 'tell' them through carefully crafted layers that all had a purpose in the context of the work. I then shortly realized that it had similarly happened with the music of other composers I particularly cherish, interestingly enough at different levels: the narrative in Berlioz' music, the depicting of scenes in Mendelssohn's, Vivaldi's structures and very codified baroque layering processes, Lutoslawski's and Ligeti's organization of textures and motives; realizing eventually how well structured the musical components of their works are.

In those, the really appealing thing to me is that the music itself becomes the message, the idiom, the carrier, the mean, the end. It is not that a clear and interpretable 'message' was communicated literally, but rather that in the context of the listening experience, things 'made perfect sense', they were 'clear'.

If 'clarity' is to be defined² as the quality of being coherent (logical and consistent) and intelligible (able to be understood), it should still be the case when talking about this quality within a musical context. However, this seemingly simple idea of a 'clear' musical stream of information is already quite ambiguous. The very nature of the information communicated by a musical object, and how it is perceived, already constitutes a large panel of questions that might get in the way of 'clarity'. How do we interpret a musical work as being 'coherent' and 'intelligible'? On what level? Can we draw a clear line between what is coherent and what is not? Is there such a thing as 'not intelligible music' for that matter?

It would seem, then, that precisions need to be made here, when talking about 'musical clarity', as to know exactly where that clarity happens.

In his Darmstadt lecture, pronounced on August 1st 1978 titled « *Der geschokte Komponist* », Wolfgang Rihm defines clarity as a « *category of musical invention, brought through form, that allows aesthetic judgment. Music can be seized, captured, through its Gestaltcharakter³* ».

The word *Gestalt* in German literally means 'shape', or 'form', and if it is through its shape that a musical composition can be 'seized' and 'captured', then we are talking about its perception *while* experiencing⁴ it.

One distinction can be made easily: there is perception (the ability to become aware through the senses) on one side, and interpretation (the action of explaining the meaning of something) on the other. If interpretation of a musical shape can be very personal and changing, its perception on the other hand stays quite consistent (left apart cases where the senses are altered due to some degenerescence of some sort). In a way, we could say that perception and its processes always precede interpretation.

That is where this investigation finds its roots: I believe that if 'clarity' is to be found somewhere, it has to be in the field of perception.

What are the main theories on sound and musical perception? Is there a possibility for the composer to understand those ideas and use them as the basis for the organization of his craft? Would those be enough to create the musical 'clarity' I am looking for? Finally, can I find a way to formalize any of those theories in my composition practice?

² Oxford Languages (2022).

³ *Gestaltcharakter* : 'shapecharacter'.

⁴ Let's already note that here the verb 'experiencing' is preferred to the verb 'listening'. This distinction is crucial to understand musical perception as a holistic process.

As a starting point for this investigation, part one establishes the philosophical ground for this investigation about clarity, particularly stressing the difference between intention and object, between form and structure, and their complementary nature and interaction with each other, before drawing a first idea on musical perception through the lens of Gestalt theory.

Parts two and three detail the different elements that come into play while applying those ideas into my composition practice. I introduce a list of the parameters that will play a prominent role in the elaboration of the formulation 'model' seen in part four by developing further my understanding of the theories elaborated by Leonard B. Meyer around the idea of 'expectation' in his book *Emotion and Meaning in Music*, and articulating them from a practical point of view.

The fourth and final part of this investigation exposes a formulation model representing my thinking on those ideas in order to conceive and use them in my composition practice. This model, based on the understanding of what will be referred as '*motion*', is the ground for the elaboration of the musical shapes in my pieces.

Since this is a composition-related investigation, the reader should be aware at all times that this work is primarily concerned with the direct applications of the theories found and developed around those investigations, but also includes my personal takes on the results that will be exposed. Furthermore, I find it very important to underline the fact that, to me, musical composition is only the initial step of a much bigger process that ends in the sharing of musical ideas to an audience.

This is really where this journey starts...

Journal - First entry: What are we all doing?

It appears we all start with a blank page. Authors, composers, artists... then the urge to write, draw, create is making itself stronger and stronger, seemingly from an unknown source, an abstract muse.

Often, this takes the form of a very simple idea. Just a hint of a something that we can't quite grasp but which develops into an obsessive idea, something that constantly comes back at us, always knocking at the doors of our consciousness, from within.

What idea?

From within, but where?

What is there to explore?

Do I make sense?

I am not talking about the subject of the drawing, the composition or book, but really that initial sparkle, that first impulse that guides us to a creative process, makes us take part into a new creative journey.

Would it be possible that this comes from a shared will to connect with something (may it be an idea, an ideal, or whatnot) that is from an other world? A world of ideas, a world of concepts, of philosophies and metaphysics?

It is actually my belief that as creators, we are drawn into the unknown through the prism of things we do actually know and remember, may it be unconsciously, and that is our experience of the world. As we take on new journeys into ourselves and the world, we are willing to explore the unknown paths of what lies beyond the physical life, only sometimes lightened by our knowledge and our consciousness.

A painter like Zdzislaw Beksiński, for instance, explores the worlds of his unconscious through his paintings. And yet, we can identify things that we may know or recognize. We understand what shape is organic, mineral. We can identify what has been maybe created and built by beings of these worlds (still talking about ideas, ideas that generate other ideas and are therefore the builders). And still, we also understand that those worlds have never been explored before, nor will they ever be explored again.

The composer explores his sonic worlds the same way. He connects with it through a path that only he knows, and is drawn deeper and deeper into it, loosing more and more his perceptions of the 'real world', to the benefit of an internal and profound insight of the world he is exploring.

Now, what does he bring back from it exactly? What ideas are then extracted and communicated to the audience?

This is the tour de force artists do: starting from a common « tacit agreement » with their audience:

1) Here is a set of agreed upon conventional points. Those could be a shared culture, already known processes or idioms, or exposed for the first time.

2) I show you my use of these conventions and make you understand my language.

3) I drag you into that mysterious world I have explored before while creating.

4) The journey is over. I drive you back home, you're safe, but now you have changed, sometimes fundamentally.

This is what I intend to do with my art. Embark on a metaphysical journey with the audience: make them think, meditate, contemplate, dream...

I.

A Quest for Musical Clarity

This investigation is by nature personal, and aims first to help me articulate my own compositional practice. In order to be able to fully explain the frame in which my creative thoughts are evolving, I deemed it first of some importance to present my own take on how I conceive what I do concretely as a composer.

Part One establishes two general concepts. Starting with the definition of *musical intention* and *musical object*, it then dives a little more into the broader topics of *form* and *structure*, clarifying the conceptual differences there can be between the two, and how I understand them and implement them in my practice. Finally, a first general idea on the perception of musical objects is presented, through the lens of Gestalt Theory.

From intentions to musical objects

What am I dealing with when I compose?

Confronted with the 'blank page' mentioned above, the first thing that arrives is *intention*. That is, a *minima*, the will to create. A first idea might then arise: a concept, an intuition, a something that may translate into a feeling, and eventually into musical thoughts: motives, timbres, harmonies, textures... *Intention* is to me what starts everything. It is the seed that creates, the blueprint of the development of a work, the space that allows the unfolding of artistic and creative thoughts. And a very interesting fact about intention is that one can feel it evolving as the work proceeds.

In his *Defense of Satie*, John Cage very simply describes 'music' as being « a continuity of sound ». Now, seen through the prism of *intention*, let me add the following: music is also a *continuity of sound-intentions*.

If the 'continuity of sound' that Cage is talking about refers to a world of acoustics and sounds, setting the light on this particular aspect of the 'outcome' of a composition, the *sound-intention* I am talking about is the will that is hidden behind the sound itself.

Thus let us define clearly a *musical intention* as being the drive, the unfolding, and the development of a part of a piece: the ‘engine’ of *motion* within a composition.

A *musical object* is ‘only what it is’: the very ‘physical outcome’ that is put out once produced by musicians or a recording. It is the sonic object encapsulated within the *musical intentions* of a work, the acoustic result of the pacing of *musical intentions* in time.

Basing my working method on this plan of intentions, I realized that I become better at giving direction and coherence to my compositions. Often, I do struggle with finding a good pacing for my ideas, how much I should develop musical thoughts, for how long inside a piece, etc... The question of time obviously is key here, and is discussed later in this paper, but for now, it feels that the first step towards clarity lies in the fact that I need to map my compositional process on this level.

My question then becomes quite simple: Can I find a way to craft my musical thoughts on the plan of *intentions*?

Since a *musical object* is ‘only’ the result of a succession of intentions, the clarity I am looking for should not be thought as the end result, meaning shouldn’t be thought around the music, but really *inside* it, through the prism of intentions. This is when I need to have a clear understanding of the difference between what I can ‘seize and capture’, the object, and what is planned, the intentions. In other words, what is perceived, and what is remembered.

I need to think about form, and about structure.

What is perceived, what is remembered (Form / Structure)

Continuing this quest for musical clarity, I couldn’t avoid looking at the two fundamental aspects of composition: *form* and *structure*.

Those two topics have been viewed and reviewed by countless artists, musicians, composers, musicologists, and philosophers, basically anyone who had any sort of connection with a piece of art or literature... Yet it seems to me that those still differ from one artist to another, from one art to another, and that a distinction is still not clearly drawn between the two.

Let me illustrate this by giving a first definition:

« *Form [musical f.]: The structure of a musical composition. The term is regularly used in two senses: to denote a standard type, or genre, and to denote the procedures in a specific work. The nomenclature for the various musical types may be determined by the medium of performance, the technique of composition or by function.* »⁵

The main problem to me here is that we traditionally call the word 'structure' inside the definition of 'form', saying that form is structure. But I prefer to think about those as not being the same idea, just making a distinction that will help shaping my thoughts in a clearer way.

After all, why is it that, intuitively, we can easily separate form and structure from each other, but while trying to find a right definition for both, they start converging and end up melting with each other? This to me can be a mistake that creates ambiguity in the functions of both ideas of form and structure.

Indeed, thinking about it, we always talk about 'sonata form', 'ABA form', 'rondo form', etc... when we should actually prefer the word 'structure'. Conversely, we often think about the structure -probably linked to some extent to the fields of architecture and sculpture- as being an object in itself, a finished product to be exposable.

In the same *Defense of Satie*, Cage makes a clearer distinction: *structure* being the « *parts that are clearly separate but that interact in such a way as to make a whole. It is what makes music distinguishable from non-being* », while *form* on the other hand is « *the morphological line of the sound continuity* ». Music is given structure by means of « *lengths of time* », while form is a consequence of decision making in creating musical material.

Further about form, the visual artist Ben Shahn⁶ states in his book:

« *Form is formulation - the turning of content into a material entity, rendering a content accessible to others, giving it permanence [...] Form is the very shape of content.* »

In those two definitions of form, I recognize the *shapecharacter* that Rihm talks about in the lecture I already mentioned in the introduction. They

⁵ Encyclopædia Britannica. 2022 - <https://www.britannica.com/art/musical-form>

⁶ Shahn, B., *The Shape of Content*. 1957

both account for the idea of the seized and captured shapes perceived by an audience.

As Shahn also later puts it, « *forms in art arise from the impact of idea upon material, or the impinging of mind upon material* ». And if structure is the frame around which forms unfold, this particularly means that I can also view structure as a succession of *musical intentions*, a canvas for the unfolding of seizable *shapecharacters*. Those intentions could then be shaped at will, and crafted as any other material would be.

This means that not only are structure and form related, but that they are co-dependent, as one is the 'shape of content', and the other its supporting frame. Referring back to my ideas of *musical intention* and *musical object*, let me then define those two ideas for myself:

Structure is a *musical intention*. It is the planned pacing of the different events, in time, of the different *shapecharacters*, of a piece of music. This is what will actually be *remembered*.

Form is a part of the *musical object* itself, the *shapecharacter* of a section of a piece of music. This is what is actually *perceived* while experiencing the music. Form is the result of a process of creating content.

From this, a direct implication follows: structuring a musical work is organizing its successive *shapecharacters* through time, and the structure of a musical composition is only remembered after we perceived its constituting *shapecharacters*. Structure is permanent in memory, form is momentary in perception.

Perceiving musical shapes: Gestalt theory

How do we perceive music? I have previously established that what is perceived is actually the *shapecharacter* of the music, what I have identified as form: the shape of the content of a stream of musical information.

To understand how to build and conceive musical forms in a clear way, I had first to learn more about how we perceive their shapes, and thinking about what it is, really, that we seize while experiencing a piece of music.

In an article⁷ found in volume 9 of *Musical Offerings*, Amanda N. Staufer exposes the similarities in the philosophies of Aristoxenus of Tarentum (*Elementica Harmonica*, ca. 400 BC), René Descartes (*Compendium Musicae*, 1618) and Leonard B. Meyer (*Emotion and meaning in music*, 1956), advocating that « *the strands of [musical] formalism and Gestalt theory in significant philosophies from ancient times to the present demonstrate that music perception and experience can be universal and timeless* ».

Without going into the topic of music universals here, premising that this paper is not a discussion on the potential 'universal and timeless' quality of music perception, the interesting point to me was that there could be a clue here might lead to the clarity I am after. Indeed, if several philosophers from different eras eventually arrived at similar conclusions, it means to me that elements of this common theory could be found and worked on to become the ground for a new approach to my composition practice, shaped towards a better clarity.

The common theory shared by those three philosophies are now commonly known as the Gestalt⁸ theory on perception. In her article Staufer reminds us of the three essential Gestalt principles applied in music:

« *First, music is a unified whole or totality, not merely separate notes. Second, a melody is the sum of its parts. Lastly, the whole gives meaning to the parts; the individual part does not acquire its meaning from itself but receives it from the whole.* »

Those three fundamental ideas are further developed in Meyer's theories on musical perception that are the foundation stones for the understanding of musical clarity that I am after. In his book *Emotion and meaning in music*, Meyer admits the position of both formalists and absolute expressionists. Basically, that means that not only does music find its perception and understanding inside the musical events themselves (formalism), but also that expressive emotional meanings arise in response to music, those meanings existing without direct reference to the 'extramusical'.

In Meyer's theory, everything is about expectations. For instance, he defines *emotion* (or *affect*) in music as being « *aroused when an expectation - a tendency to respond- activated by the musical stimulus situation, is*

⁷ Staufer, A. N., *The Unifying Strands: Formalism and Gestalt Theory in the Musical Philosophies of Aristoxenus, Descartes, and Meyer*. 2018

⁸ Early 20th century school of psychology initiated by Max Wertheimer (1880-1943), Kurt Koffka (1886-1941), and Wolfgang Köhler (1887-1967) introducing the founding concept of, in brief, 'the whole is greater than the sum of its component parts'.

temporarily inhibited or permanently blocked », and that a musical event acquires *meaning* if it « *points to and makes us expect another musical event* ».

Meyer further specifies that for those expectations to happen, so, for *emotion* or *meaning* to arise, there needs to be a prior *knowledge*, at least partly, of what is experienced. This takes the form of what he defines as the *preparatory set*:

« *the mental and physical adjustments, performed consciously or unconsciously, which serve to facilitate and condition the subsequent responses made to the expected stimulus. The specific adjustments made are [the] product of: (1) the listener's beliefs about aesthetic experience in general and musical experience in particular, (2) the experience and knowledge previously acquired in listening to and studying about music, (3) information gathered on the particular occasion in question* ».

This is of key importance in my investigation as this also means that if, as we saw earlier, creating musical emotion and meaning is about creating and pacing expectations, then this can in particular be done through the means of playing with this preparatory set. Concretely, that means that I can act upon any combination of the three mentioned items to create the shapes in my pieces.

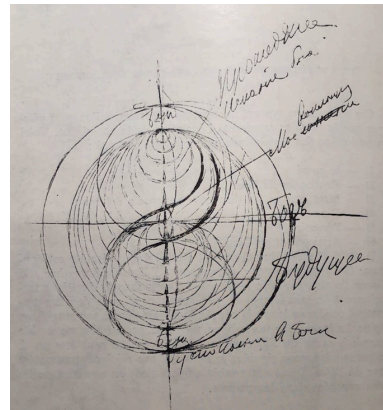
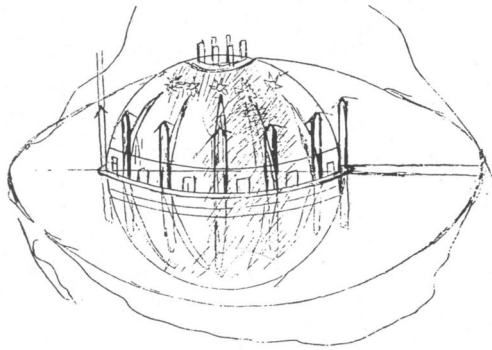
The 'musical clarity' I am looking after, introduced for the purpose of this investigation, can now also be a little more precisely understood. If clarity is, as stated in the introduction, the ability to 'seize and capture' the shapecharacter of the music I am experiencing, I can now add that what we concretely 'seize and capture' is what Meyer defines as emotions and meanings, and the musical journey that brings us to them. In other words, creating musical clarity means being able to shape the understanding of the evolution of *musical moments* in a piece, in the context of expectation.

Journal - Second entry: The very special case of Mr Alexander Scriabin

The composer Alexander Scriabin is one of my main sources of inspiration for this investigation.

When I listen to his music, it sometimes feels that he was a sort of solitary explorer whose map was only known to himself... A little bit like Beksiński with his paintings.

During those explorations, Scriabin would write personal notes, actual written poems, and musical drafts next to each other, creating a sort of game of clues and hints that would eventually lead him to give their final forms to his compositions, contextualizing his discoveries and journeys inside a world of metaphysical and mystical musical thoughts.



Left: Scriabin's sketch of the celebration temple for 'Le Mystère'

Right: Evolution of consciousness according to Scriabin⁹

What I find beautiful in Scriabin's approach, is that he was genuinely involved in an active research of his Truth, yet always departing from the common ground of the classical and romantic traditions of music, but also always pushing further its boundaries. This probably made every step of his metaphysical journey a milestone for the next one.

I realized that I have a similar approach to that crafting 'method', in a way, as I also write a lot (with words) the concepts and intentions I am thinking about, as if doing a preliminary 'compte-rendu' of the world explored, during a journey into the unknown. I also sometimes write poems about one of those journeys.

This is also what helps me create my musical material, shaping intentions into 'musical moments', for every new piece.

⁹ Scriabin, A., *Notes et Réflexions - Carnets Inédits*, ed. Marina Scriabin. 1979

II.

Topology of musical moments

This part details further details the notion of what I called at the end of the first part *musical moments*. After defining them, I will look at their ‘vertical topology’ (how they are constituted by means of superimposed layers), and their ‘horizontal topology’ (the unfolding components of those layers in time). These three ideas are developed around the topic of perception once again, introducing the Gestalt concept of *grouping* in particular. Meyer’s theories on creating emotion and meaning will also be looked at.

Musical moments

In the first part, we have seen that structure is pacing, and that form is a result of a process of creating content. We also saw that what is seized and captured is the actual feeling of what Meyer defines as *emotion* (or *affect*) and *meaning* in music. We finally concluded that the pacing of expectation is what eventually creates the different shapecharacters of a piece.

In order to be able to work successfully with pacing expectation, let me introduce the notion of *musical moment*. I will call *musical moment* a part of the perceived form. A *musical moment* is a chunk of the shapecharacter, a block of what is *fully perceived* while experiencing a musical work.

As I explained earlier, structure and form are co-dependent. Another way to understand what has been explained in part one is to see that both the perception and memorization of a musical work is done simultaneously in two directions: a vertical direction that shows different layers and their interaction with each other at any given moment in the piece, and a horizontal direction that capture the motions of those interactions through time.

Any given *musical moment*, then, is constituted of two fundamental components: firstly a vertical component, later referred to as *situation*, that helps seize the shapecharacter of the moment we are experiencing; and secondly a horizontal component, later referred to as *motion*, that makes understandable the unfolding of the situation it is coupled with.

Vertical topology of musical moments

The first component of a musical moment is called a *situation*. The idea is simple: it is the sum of all the intended¹⁰ sounds and combination of sounds, motives, layers, effects, etc., that are happening at a given moment in a piece. In a way, this is a ‘snapshot’ of the music we perceive. When talking about the music itself, this is typically represented by looking at a specific moment in a score: we see all the different layers and their functions at one glance.

It also comprises the intended extra-musical elements¹¹ that must be considered as it affects also our perception of musical experiences, such as lights, staging elements, lyrics, etc...

In chapter 6 of his book *The Intelligent Ear*, expert in psychoacoustics Reinier Plomp reminds us that sound perception is a form of ‘object perception’. It is a holistic process. Plomp states clearly:

« *[Auditory perception] obeys Gestalt principles. [...] The ear reconstructs from the mixed incoming fragments a ‘picture’ of the various sounds comprising the incoming mixture - auditory objects to be learned and recognized.* »¹²

Plomp’s approach to psychoacoustics and perception draws a parallel between sound perception and language in particular. However the previous quote which talks about one of the fundamental laws in Gestalt theory, *grouping*, helps us take the next step towards my quest for clarity.

On that topic, Gestalt Theory expert Diana Deutsch says:

« *When presented with a complex pattern, the auditory system groups elements together according to some rule based on frequency, amplitude,*

¹⁰ It feels important to me to specify here that these actions are ‘intended’, in the sense that if I am talking about composition, I am talking about a conscious act of creation, meaning the conscious planing and pacing of *musical intentions* in time.

¹¹ This investigation is really about ‘musical clarity’, and even if it is obvious that extra-musical elements are to be taken into account in the perception of music, I will only focus on the sound aspect of it in this paper.

¹² Plomp, R., *The Intelligent Ear*. 2002

temporal position, spatial location, or some multidimensional attribute such as timbre. [...] Any of those attributes can be used as a basis for grouping, but the conditions determining which attribute is used are complex ones. »¹³

Further specifying that :

« The early Gestalt psychologists proposed that we group elements into configurations on the basis of various simple rules: [...] proximity: closer elements are grouped together in preference to those that are spaced further apart, [...] similarity, [...] good continuation: elements that follow each other in a given direction are perceptually linked together, [...] common fate: elements that change in the same way are perceptually linked together. »

Using Deutsch's thinking on *grouping*, we can imagine any shapecharacter as being constituted of different groups, or layers, that unfold and interact with each other in a more or less distinct way. This is what is making the musical object 'seizable'.

For the purpose of this investigation, let me then define a *sound layer* as being a certain group of sounds and/or combination of sounds that follow this concept.

This idea leads us naturally to introduce Meyer's concept of *sound term*. In *Emotion and Meaning in Music*, Meyer defines a *sound term* (or *musical gesture*) as being a « *group of sounds (whether simultaneous, successive, or both) in a particular system that indicate, imply, or lead the listener to expect a more or less probable consequent event* ». A *sound term*, naturally, is then a specific *sound layer*.

The key element to understand here is that everything depends upon a certain context. I have mentioned already that for Leonard Meyer, everything is about expectation, which he defines as being « *a tendency to respond* ». Creating expectation only makes sense in a certain context, particularly in music, where a 'tendency to respond', for instance to a given chord progression, might arise in a certain context, and not in another. This will be further explained in the next part of this investigation.

I have now established which vertical component enters in the creation of a musical moment: a *situation* that is comprised of different *sound layers*, some of them being potentially *sound terms*, as well as any intended extra-musical element being paced at the same instant.

¹³ Deutsch, D., *Grouping Mechanisms in Music*. 1999

Horizontal topology of musical moments

The second component of a *musical moment* is what we can call its *motion*.

When I have introduced the notion of *musical moment*, I have stated that it is a chunk of the shapecharacter of a piece. This implies that it has a certain duration. If the first component, the *situation*, is the construction of this moment 'vertically', the second component, the *motion*, is rather one that deals with the aspect of perceived movement.

When talking about *motion*, I am not talking about the musical motions of a passage in a piece that are really intrinsic to the music itself. Setting once again this idea on the plan of *intentions*, I am rather talking about the 'cognitive movement' that enables the creation (or destruction) of expectation, that is: the feeling of direction in perception.

The need for this horizontal component for musical moments is illustrated by Meyer in chapter two of his book as he points out the « *dangers of concentrating too much attention upon the structure of the musical work as a single sound term interpreted as a stable whole. Too much emphasis upon the highest architectonic level [...] leads to a static interpretation of the musical process.* »¹⁴

Concretely, nothing is *attached* to motions, but everything is done *through* them. These are only conceptual movements (that can eventually translate into a certain musical unfolding of different situations) chosen to fit in a particular context of expectation. With regards to this 'particular context of expectation', I refer to what Meyer calls the 'preparatory set', as seen earlier in this paper.

Let me then define the *motion* as follows: the feeling of direction towards meaning, emotion, ambiguity, or any sort of reaction, that is aroused while experiencing the music.

¹⁴ Meyer, L. B., *Emotion and Meaning in Music*. 1956

Special musical moments

In order to create *musical moments*, the composer thus needs to work on its two components: the *situation*, and the *motion*. Depending on context, the pacing of those are what actually defines the successive *shapecharacters* of a piece.

I have said earlier that a possibility for the composer would be to play with what Meyer class the *preparatory set*. Hidden in those, are all the *norms* of the piece which are experienced. Meyer define *norms* as being the « *customary or expected progression of sounds* »¹⁵. These 'norms' depend on the musical style that the composer writes in, but also include all the 'rules' that he decides to introduce for the purpose of a given piece.

Only once such *norms* are clearly set in a piece can the idea of *expectation* arise. Indeed, it is only because the listener 'knows the rules' of what is about to be played that he can expect a more-or-less-probable progression of sounds to happen. This is of key importance.

In that regard, an *expectation* is itself a *motion*, a drive towards a certain *situation*. A *resolution* is a situation that is the actual happening, confirmation, of an expectation. Any alteration in the expected progression, then creating surprise, is what Meyer calls a *deviation*. It creates emotion, affect.

I recognize these elements as being components of what is usually called a *climax* (a *musical moment* whose situation is a particularly strong *resolution*), an *anti-climax* (a *musical moment* whose situation is a *deviation*), and what I like to call a *pivot* (a *musical moment* whose *motion* is an *expectation*).

¹⁵ Meyer, L. B., *Emotion and Meaning in Music*. 1956

Journal - Third entry: André chante sur une baleine.

I have started to read the Manifestes du Surréalisme by André Breton.

In his first manifesto, Breton not only explains where surrealism comes from, but also presents examples of what I believe could very much apply to my composition process. The most interesting fact to me is I realized that even for a surrealist, some 'fundamental elements' need to be used in order to create a new meaning. That is, sort of 'literary atoms' (understood by all) are needed to create an interaction that will eventually translate into a new meaning. For instance, when I say:

*« A bald bear
tabled out
plane is green
and
or
André
chante sur
une baleine. »¹⁶*

this typical (and badly written) surrealist poem obviously doesn't make sense in reality, but has meaning on a plane of ideas and dreams. Yet truncated to its core elements, every word is recognizable, understandable in our 'conventional reality'. Only their combination creates a new, unknown meaning. This is a real creative beauty to me: from known to unknown.

I suppose this is what I also found in Beksiński's paintings, or in Scriabin's music... When combinations of shapes, colors, symbols, etc., create new motions, new understandings, but still, at its kernel, something immutable, the final function of each element being eventually determined only in the context of the finished work.

That is what I find also, when composing, in the concepts of sound terms, sound layers, the crafting of musical moments, their combinations and evolutions. It is not only that they have a meaning themselves (an identity outside of the music), but really that their interaction with each other, their articulation, create a new meaning in itself...

...in any case, « André chante sur une baleine ».

¹⁶ Original 'composition'...

III.

What do they say about...

Before being able to concretely represent these ideas into a formulation 'model', some additional points need to be covered, particularly as they help with articulating in practice what has been introduced in the first two parts.

This part is presented from a more practical angle. Through some examples taken from my piano cycle *Cinq Éclats d'Éternité*, it deals with the questions of ambiguity, time, and proportionality.

...ambiguity?

According to Meyer, ambiguity is « *a state of mind in the listener. [...] Ambiguity arises either because the progressions involved in a passage are so consistently irregular and unexpected that the listener begins to doubt the relevance and efficacy of his own expectations or because the shapes of the sound terms are so weak and uniform that there is only a minimal basis for expectation.* »¹⁷

Playing with ambiguity as a composer can be a very interesting thing to do. I tried to emulate it in the first piece of my cycle *Cinq Éclats d'Éternité*, where all the musical elements are only present to trigger resonances in the piano (using the third pedal).

Setting the 'norms' was here done by choosing only a few pitches as the base for my harmonic palette (the ones that are present in the depressed chord at the beginning of the piece, with an added f natural), letting eventually other pitches float around, but always coming back to it as a reference color.

¹⁷ Meyer, L. B., *Emotion and Meaning in Music*. USA: The University of Chicago Press, 1956

Décidé et intérieur.
 (♩=105-110)

f
sempre senza Ped.
Ped. 3

Cinq Éclats d'Éternité - I, bar 1.

Apparent ambiguity was built upon the idea that a motive could be present, but so detached from the other happenings that the link between them would not be as obvious as if it were in a continuous musical flow. This was done by means of multiple stops using fermatas of empty bars inside the piece.

restez alerte (comptez strictement)

Cinq Éclats d'Éternité - I, bars 7-8.

Entering the second half of the piece, at bar 9, a new motivic idea takes over, introducing a new sound term, as well as a new sound layer (boxed) violently interrupted by a trill that serves as a deviation.

9 Non mesuré.

contemplatif
p douce
avec un sens improvisé
espacez les événements de plus en plus
très violent et bref
laissez résonner
fff
tenez l'accord jusqu'à extinction du son

Cinq Éclats d'Éternité - I, bar 9.

Until the end of the piece, ambiguity arises not just because a certain amount of chaos is created, but because resolution is always avoided, every musical event in the piece being surrounded by uncertainty as to what to expect next. This was done with the help of mixing both measured and non-measured sections, melting them with each other to blur any feel of pulse. Finally, repetition is used only to induce a certain direction, but always avoids completion.

11 Au mvt.
p

16 Non mesuré.
ppp très lié

maintenez les notes losanges pour former graduellement un cluster

retirez la Ped. 3 et relâchez l'accord tenu en meme temps p douce

(Ped. 3)-----|

Cinq Éclats d'Éternité - I, bars 11-16.

Eventually, the careful listener understands that there is one element that is still developing all throughout the piece: the resonance of the depressed chord set at the beginning.

...time?

Together with performance and film, Music is one of the arts that requires time to develop and happen. Visual art is grasped at a glance, readers can adjust their reading speed to their will... But that is not at all the case with music. About time, Professor David Butler highlights the following:

« One of the most interesting and mysterious aspects of time in general is that clock time and mental time can be quite independent of one another. »¹⁸

Further explaining that:

« At one level, experience tells us that we track the successive events of music as we encounter them while listening to the performance; but at another level, we compare ongoing musical events with our memories of what we have already heard in this piece, making connections with easier listening experience and making tacit predictions about what we will hear. At yet another level, we draw on our experience with other compositions that share formal and stylistic features with the music in process, and that experience shapes our attention. »

This aspect of mental time being personal was explored in the second piece of this cycle, where the player is in charge of grouping, pacing and creating the phrasing of the given material.

Here I wanted to leave the possibility to the player, who is the first one to perceive the music, to create their own version of the time they feel should be taken to successfully have those events unfold.

The result of such a grouping and pacing is that the materials I have defined as its 'musical moments' totally change from one decision to another, creating a new shapecharacter at every new performance.

¹⁸ Butler, D., *The Musician's Guide to Perception and Cognition*. 1992

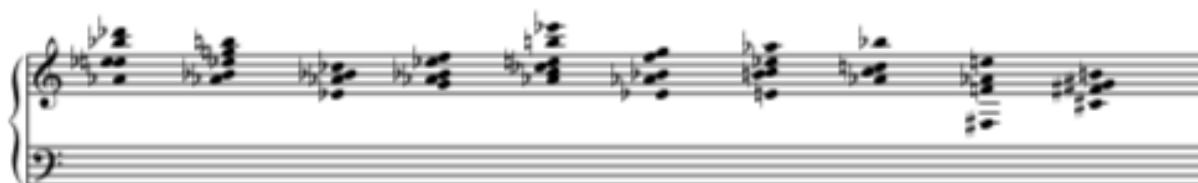
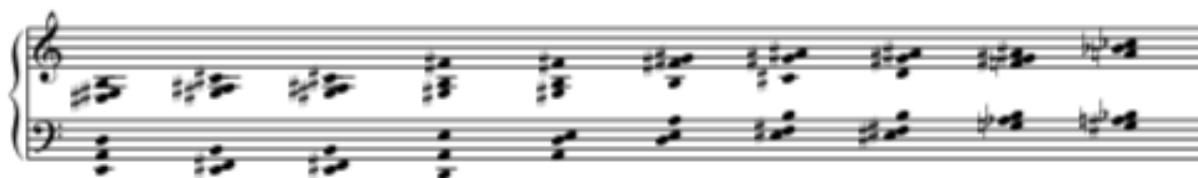
II.

L'appropriation de ce texte (création des phrasés, nuances, durée des événements musicaux, etc.) est totalement laissée à la discrétion de l'interprète.
De manière générale, cette pièce doit être jouée religieusement.
La pédale de résonance doit toujours être utilisée, imitant ainsi une acoustique d'église.

Très lent et libre. Non mesuré.



sempre con Sù



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Cinq Éclats d'Éternité

Cinq Éclats d'Éternité - II

...proportionality?

There is no music without proper timing, we have seen, hence there is no music without proper structure.

In *Defense of Satie*, Cage argues that structure is « *the only thing to be agreed upon* » in music, taking the example of the music of Satie and Webern, who, according to Cage, were the only two masters to have understood and overcome the problem of the lack of novelty in structure since Beethoven, by shifting their thinking of structure from harmony to time.

But mastering structure means mastering pacing. In other words, it is about setting the right proportions of time that the composer decides to allocate to each *shapecharacter* in a piece. About proportionality, Butler has a very interesting statement:

« *We can question the perceptual significance of whatever proportional relations may exist in music. [...] even if proportions are demonstrably present in the performance score, can they be heard?* »¹⁹

In the third piece of my cycle, I played with this question in order to try and feel proportion and structure. I worked on a double idea: a structure that was conceived as both ternary and symmetrical at the same time.

This piece consists of only three bars. The concept of symmetry appears not only in the elaboration of its structure, but was also the basis for the elaboration of the three parts (see score).

¹⁹ Butler, D., *The Musician's Guide to Perception and Cognition*. 1992

libre et assez flexible

pp dolce *p* *pp*

mp *mf*

f *mf* *dim.* *mp*

p *sempre dim.* *ppp*

En relâchant légèrement peu à peu.

Cinq Éclats d'Éternité - III, bar 3.

See for example how the middle of bar 3 rebounds on itself, at a climactic point, enabling the smooth transition into the symmetrical phase of the piece. Note also how the same symmetry is being blurred by the constant tenuto note still placed at each beginning of a group of eighth notes, enabling the conservation of the pulse.

The ternary aspect appears rather obviously in the material itself, showing a distinct separation between the three parts of the piece (see score below).

Concerning the pertinence of proportionality, Butler later concludes with a nuancing point of view found in proponents favorable to theories of proportionality :

« It is enough, they say, to know that such long-range relationships exist in the music, because these relationships can influence the choices a composer may make, and these relationships may be indirectly important to the way we perceive the music. »²⁰

6

III.

Toujours simple et flexible. Très délicat.
(♩=env. 92)

*Pour ce numéro uniquement, les abréviations ne s'appliquent qu'aux notes auxquelles elles sont directement rattachées.

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Cinq Éclats d'Éternité

7

Cinq Éclats d'Éternité - III, Full.

²⁰ Butler, D., *The Musician's Guide to Perception and Cognition*. 1992

...what I am not talking about?

Having covered the various concepts discussed above, I would like to conclude this section with a simple fact.

Mentioning all the results and concepts established by Meyer, Butler, Deutsch, Plomp, etc., would be an impossible task to accomplish a single master research paper. During my investigation, I selected the various functions that I considered being the foundation stones for building and articulating of a workable composition practice.

However I cannot stress enough the importance of reading these authors, to discover further (and potentially endless) possibilities that those principles offer.

The following mathematical formulation of these selected functions are the ground to further explore the worlds of Gestalt and perception theories.

Journal - Fourth entry: Do you speak music?

I think I now feel the need to formulate, create (if not existing already), a model that can, if well constructed, be applied in my working process: a sort of language that is taking as parameters the concepts I have discovered or created so far, and surely some others to come, and their interactions with each other... and find a way to pace and organize those in the context of my work.

Once such a model is set, what could be interesting would be to do the analysis of a few pieces...? Take any sort of piece, from any genre, style or era, and try to draw the model onto it... Why not!

Coming from a mathematical background, I have learned to appreciate the possibility to encapsulate in one symbol a chunk of information, and in a line, a full intellectual motion, a movement that leads to another, which leads to another, which leads again to another...

As a composer, I am not always aware of where my ideas come from, and I sometimes write instinctively. In such cases, where the unconscious mind takes over, I feel I have no full control of how my music would potentially be perceived. Looking at it through the lens of this model, I feel I could improve that... greatly...

IV.

Mathematical formulation for several functions of musical perception.

The following will show a small representation model of the thoughts articulated above. Their main purpose is to help me formalize the different elements discovered during my investigation in my own practice as a composer.

I would like to emphasize that I do not use this 'model' systematically in its entirety for every composition, nor think of it as an algorithm to be applied while composing (this, by nature of the established model, wouldn't be possible anyway). Rather I see it as a map, a guide that helps me tackle the difficulties encountered while composing, a reference for the clarification (or the opposite if I so desire) of my musical discourse.

One could ask why a new formulation would be needed to apply those discoveries in practice. The answer is very clear, the world doesn't need a new formulation approach to those concepts, only I do. Coming from a mathematical background, I simply find it easy and efficient to condense in a few lines, or even one symbol, a function, a process, an idea... Let us begin.

Recapitulation and formulation

The first three chapters helped me develop and articulate different functions of musical perception which now helps me in my composition practice.

I realized that writing those ideas in a few symbols enabled me to actually play with those formulations, on the page, as a material to be crafted. Let me then recapitulate those ideas, as succinctly as possible, and introduce this personal formulation.

The mathematical aspect of the following only serves as a 'compacting formulation tool' of the functions of musical perception described in this paper.

Mathematical Formulation for Functions of Musical Perception

(1) A *Musical Object* (Ω) is the end result of certain *musical intentions*. Potentially divided in several movements, those ‘intentions’ are what create the *Structure* (Γ) of a piece of music, which is what is eventually being remembered. We can express it as :

$$\Omega := [\Gamma_n]_{n \in \mathbb{N}}$$

(2) Based on the definition of ‘clarity’ introduced by Rihm, as well as ideas about form from Shahn and Cage, I have established that a *Form*, or *Shapecharacter* (γ) is what is actually perceived while experiencing the music. Thus, *Structure* can be seen as a succession of *Shapecharacters* carefully paced through time. We can notate it as follows:

$$\forall n \in \mathbb{N}, \Gamma_n := (\gamma_i)_{i \in \mathbb{N}}$$

(3) I have then introduced the notion of *Musical Moment* (χ), defined as being a chunk of a given *Shapecharacter*, and consisting of several elements: **(a)** a vertical component called a *Situation* (S), and **(b)** a horizontal component called a *Motion* ($\vec{\mu}$), such as we have:

$$\forall i \in \mathbb{N}, \gamma_i := (\chi_j)_{j \in \mathbb{N}} ; \text{ and } : \forall j \in \mathbb{N}, \chi_j := (S_j, \vec{\mu}_j)$$

(4) In accordance with Deutsch’s statements on one of the fundamental Gestalt mechanisms called ‘grouping’, I also specified that a *Situation* is comprised of different *Sound Layers* (S^L), some of which, in a certain context could be what Meyer calls a *Sound Term* (S^T). We could see it as follows:

$$\forall j \in \mathbb{N}, S_j := \{S^{Lk}\}_{k \in \mathbb{N}}$$

(5) I have also talked about specific *Musical Moments* such as : *Climax* ($\bar{\chi}$), *Anti-climax* ($\underline{\chi}$), and *Pivot* ($\overset{\circ}{\chi}$). Those were defined as being combinations of specific *Situations* and *Motions* that are of particular interest for the composer. Those were called *Expectation* (\vec{e}), *Deviation* (δ), and *Resolution* (ρ). As we already saw, we have:

$$\begin{aligned}\bar{\chi} &:= (\rho, \vec{\mu}) \\ \underline{\chi} &:= (\delta, \vec{\mu}) \\ \overset{\circ}{\chi} &:= (S, \vec{\epsilon})\end{aligned}$$

Applications

The previous formulations are a series of small ‘drawings’ that help me to draw on the page the different components that they represent, while composing. It happens that I sometimes focus on one or several of those components, not necessarily using them all, every time. For instance, the *Shapecharacters (3)* are components that I often look into while working on a piece. It also happens that focusing my work on *motion (3)(b)* ended up helping me create a musical momentum, or concept for a piece, etc...

Conclusion

The theories of Leonard B. Meyer, as well as the writings of David Butler, Diana Deutsch and Reinier Plomp on perception and Gestalt psychology can be seen as principles for drawing clarity in musical perception. 'Clarity', here, as defined by Wolfgang Rihm, depends upon the context in which musical events unfold, setting the ground for expectation to thrive.

In this context, the role of the composer is double: first, he needs to set the rules for the audience to be able to follow the directions of expectation and understand when those expectations are fulfilled, or deceived. Second, playing with what Meyer calls the 'preparatory set' of the listener, he elaborates the *shapecharacters* of his pieces by pacing their different *musical moments*.

I have stated, quite a few times now I believe, that this investigation was very much about helping me articulate and organize my thoughts in my compositional practice, initiating the creation of musical material, norms, tools, etc. But I am hoping that this investigation will also find an echo in the practice of others, as I believe that it now presents a general understanding of functions of musical perception designed for musical composition. It is those functions that have been formulated into a model in part four.

This representational model helps me to map and represent the different functions of musical perception while I compose. This is now a guide that I constantly use in my practice, like a map of the different cognitive possibilities towards the musical shaping of 'clarity'. However, the application of this model has equally helped me understand other pieces of music, by analyzing them through it.

From here, further formulation of other functions of musical perception can be done by looking into more specific aspects of the different theories in this field. The interest I find that lies in this model is that it can be shaped at will by any composer, from any style, and is open enough to be further developed by anyone pursuing the same quest for musical clarity.

Nomenclatura

- Ω : Musical Object
- Γ : Structure
- γ : Form (or *shapecharacter*)
- χ : Musical moment
- $\bar{\chi}$: Climax
- $\underline{\chi}$: Anti-climax
- $\overset{\circ}{\chi}$: Pivot
- S : Situation
- S^T : Sound term
- S^L : Sound Layer
- $\vec{\mu}$: Motion
- $\vec{\epsilon}$: Expectation
- ρ : Resolution
- δ : Deviation

Glossary

- **Ambiguity** (Meyer) : « *A state of mind in the listener. [...] Ambiguity arises either because the progressions involved in a passage are so consistently irregular and unexpected that the listener begins to doubt the relevance and efficacy of his own expectations or because the shapes of the sound terms are so weak and uniform that there is only a minimal basis for expectation* ».
- **Anti-Climax** : A musical moment that is of a type (Deviation , Motion).
- **Clarity** (Rihm) : « *A category of musical invention, brought through form, that allows aesthetic judgment. Music can be seized, captured, through its Gestaltcharakter* ».
- **Climax** : A musical moment that is of a type (Resolution , Motion).
- **Deviation** : A situation that alters the expected progression of sounds.
- **Expectation (1)** (Meyer) : « *A tendency to respond* ».
- **Expectation (2)** : A motion that sets a tendency to respond.
- **Emotion** (Meyer) : The conscious or unconscious reaction « *aroused when an expectation -a tendency to respond- activated by the musical stimulus situation, is temporarily inhibited or permanently blocked* ».
- **Form** : A part of the *musical object* itself, the *shapecharacter* of a section of a piece of music. This is what is actually *perceived* while experiencing the music. Form is the result of a process of creating content.
- **Gestaltcharakter** : The components of a *musical object* that can be perceived while experiencing music.
- **Gestalt** : Early 20th century school of psychology initiated by Max Wertheimer (1880-1943), Kurt Koffka (1886-1941), and Wolfgang Köhler (1887-1967) introducing the founding concept of, in brief, 'the whole is greater than the sum of its component parts'.
- **Intention** (musical i.) : The drive, the unfolding, and the development of a part of a piece: the 'engine' of *motion* within a composition. More generally, *intention* is the seed that creates, the blueprint of the development of a work, the space that allows the unfolding of artistic and creative thoughts.
- **Meaning** (Meyer) : A musical event has meaning if it « *points to and makes us expect another musical event* ».
- **Motion** : The feeling of direction towards meaning, or emotion, or ambiguity, or any sort of reaction, that is aroused while experiencing the music.
- **Moment** (musical m.) : a chunk of the shapecharacter, a block of what is *fully perceived* while experiencing a musical work.
- **Object** (musical o.) : the very 'physical outcome' that is put out once produced by musicians or a recording. It is the sonic object encapsulated

within the *musical intentions* of a work, the acoustic result of the pacing of *musical intentions* in time.

- **Resolution** : A *situation* that is the actual happening, confirmation, of an *expectation*.
- **Shapecharacter** : (see *Gestaltcharakter*)
- **Situation** : the sum of all the intended sounds and combination of sounds, motives, layers, effects, etc., that are happening at a given moment in a piece as well as the intended extra-musical elements happening at the same time such as lights, staging elements, lyrics, etc...
- **Sound Layer** : a certain group of sounds and/or combination of sounds that follow Gestalt laws of grouping.
- **Sound-intention** : the will that is hidden behind the sound itself, the drive, the unfolding, and the development of a piece: the 'engine' of *motion* within a composition.
- **Structure** : Structure is a *musical intention*. It is the planned pacing of the different events, in time, of the different *shapecharacters*, of a piece of music.
- **Sound term** (Meyer) : A « *group of sounds (wether simultaneous, successive, or both) in a particular system that indicate, imply, or lead the listener to expect a more or less probable consequent event.* »
- **Topology** : The way in which constituent parts are interrelated or arranged.
- **Pivot** : A *musical moment* of the type (Situation , Expectation).

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Links

- Listen to *Cinq Éclats d'Éternité* : https://soundcloud.com/charlesbaumstark/sets/cinq-eclats-d-eternite?utm_source=clipboard&utm_medium=text&utm_campaign=social_sharing
- Personal Website: <https://charlesbaumstark.com>
- Research page on my website (might be useful if I take this research further... time will say): <https://charlesbaumstark.com/a-quest-for-musical-clarity>

