



Leonardo

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Source: *Leonardo*, Vol. 32, No. 4 (1999), pp. 317-323

Published by: [MIT Press](#)

Stable URL: <http://www.jstor.org/stable/1576729>

Accessed: 18-11-2015 11:30 UTC

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Sound Material: A New Reception

Pascal Gobin

My aim in this article is to show how technological evolution and, above all, the technological tools presently available to musicians (and in a larger sense, to all artists working in the domain of the sound arts) can represent more than the means of rendering efficient the practical aspects of composition, its realization or its diffusion [1]. Technology can engender a new approach to “found” sound material for musical ends and allow a new approach to musical material that induces new ways of thinking about music. In fact, two major aspects of composition—the liberation of musical potential via the use of new sounds (particularly those originating from sources other than “musical instruments”) and the conception of ways of “playing” these sounds—are closely bound. They are but two facets of the same problem: the exploration of musical composition.

It seems to me that the important contributions in the domain of technology for musicians have been:

1. the techniques of sound recording on magnetic support as it presently exists: magnetic tape allows sound editing with a pair of scissors and adhesive tape.

2. the techniques of sound synthesis, notably the real-time systems of control that were tied initially to techniques of analog synthesis and that have developed since then due to numerization systems (notably the MIDI system).

These two technological advances have placed musicians in a new relationship to sound [2], permitting both a material approach and musical theory that exercises itself in the domain of the qualitative. In effect (expanding on Pierre Schaeffer’s idea of *musique concrète* [3]), thanks to the possibility of recording sound on a manipulable apparatus [4], sound may be approached as a musical duration based on the overall perceived qualities of the sound itself rather than as an ensemble of parameters determined by the listener’s ability to perceive the sound in terms of quantifiable units that are subject to systematic organization.

The other aspect that I believe is equally important, and that I will try to develop in this article, involves the notion of experimental technique (i.e. experimental music) at the basis of all musical realization, from the fabrication of sounds to their final realization [5], with an attitude of both attentive listening and discovery. According to Schaeffer:

To our beginner, moreover, we do not give any exterior model of sonorous realization; it suffices that he learn how to handle advisedly and not without skill the bow and the mallet, the microphone and the potentiometer. To make what? Not sounds that are valuable according to certain musical criteria (which would be, moreover, difficult to define at this level of the research), but simply sounds that are as “decontextualized” as possible from the traditional musical system, and at the same time as successful as possible on the plane of interest, originality and subtlety—in other words, those criteria which regard their form and their content as appreciated in a reduced listening [6].

A BRIEF HISTORY: SOUND, SIGN, WRITING

Without encroaching upon others’ work more specifically dedicated to the history of contemporary music, I will try here to illustrate how the relationships between sound, sign and writing have evolved. In Western musical tradition, we tend to separate the work of writing from the work of interpretation—or, in other words, the labor of conceptualization and organization of the music (the composition) from its sonic realization. Through the course of centuries, the system of signs has been imagined and perfected, permitting—with the support of a solid tradition of interpretation—the passage from the written to the sonorous.

Obviously, not everything can be fixed by notation—sonorous phenomena are much too complex for notation to capture in all its details. This means that any notation is a convention involving a particular musical environment: it is necessary to make a choice to notate the certain aspects of sound (or instrumental gestures allowing one to reproduce the sound) that seem particularly pertinent in relation to a musical project. One can easily imagine, without being a specialist, that the first attempts at musical notation were memory aids (perhaps used equally for pedagogic ends) for music based essentially on practice anchored in the oral tradition.

At a certain point, notation became necessary in order to fix innovative changes in tradition due to improvisation, mistakes and chance.

These first elements of notation, the *neumes*, displayed the composer’s intent to represent melodic inflections via a continued movement rather than by a succession of dots to which a proportional durational value is assigned (that is, notes).

In the course of the thirteenth century, notation became more and more precise and radicalized in its notions of fixed pitch height and proportional duration. At first glance, the passage from notation in the form of continued traits to notation in the form of discontinued points appears purely functional. It is nevertheless interesting to note the differences between notation in neumes and notation in note fig-

ABSTRACT

The author offers new approaches to sound material and composition made possible by advances in technology and modern musical theory. He then discusses the use of Semiotic Temporal Units (USTs) as a method of organizing sound material into morphologically based categories in an attempt to reenvisage Western notions of musical composition. Finally, the author presents recent examples that illustrate the need for a rethinking of compositional rules and methodologies.

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This paper combines two lectures presented at “The Aesthetic Status of Technological Art” colloquium, Les Treilles Foundation, France, 5–8 March 1997. An earlier version of part of this text was published in French in *Alliage*, Nos. 33/34 (1998).

ures: the continued *movement* expressed by the neume became a *succession* of fixed points for reasons of efficiency and precision. Even so, one can see the beginning of an alteration in musical thought: starting from a system of symbols designed for the memorization and fixation of elements, we moved imperceptibly to an assortment of operative symbols for musical composition, which can be thought of as the art of combining and organizing “parameters”—those abstracts of *sonorous reality* established as the fundamental values of a musical system.

The term “organization” itself is not innocent and, parallel to that, the tradition of Western musical writing rests in large part on the integration of calculations into the structure of musical works (bear in mind that music was taught alongside mathematics during the Middle Ages). These calculations depend on the preconceived definition, structuring and hierarchization of sound material prior to, and independent of, the existence in time of the work itself.

We arrive thus at the idea that musical thought has throughout history centered itself little by little towards the notions of pitch height and duration. Obviously, we are aware that Mozart (or Bach or Beethoven) did not compose via an “outstringing” of notes, one following the other; however, in our analysis (and most probably due to a lack of analytical tools), we have gotten used to reducing the material on which musical thought exercises itself principally to the two notions of pitch height and duration.

TIMBRE

Traditionally, the term “timbre” [7,8] signifies instrumental timbre, commonly defined as the character of sound that varies as two notes of equal pitch and duration are played by two different instruments. In fact, this definition corresponds to a sound “type” for a certain class of instrument and does not take into account certain physical realities (to speak of a note from a trumpet or a piano says nothing in particular about the essential physicality of sounds that one hears and, in effect, masks part of the reality of the sounds).

One can equally contend that the notion of timbre does not represent a fundamental element of musical work (as shown in the practices of transcription and reduction).

SOME NEW APPROACHES TO SOUND MATERIAL

Let us consider some examples of new approaches to musical material, along with the possibility of recording, understanding and transforming sound via listening, imagination and creativity.

PIERRE SCHAEFFER AND “LE SOLFÈGE DE L’OBJET SONORE”

Pierre Schaeffer is generally cited as the inventor of *musique concrète*. Beyond this status he is equally (and perhaps above all) the initiator of a fundamental reflection on both musical practice and sound material. The true aim of *musical research*, separate from the material itself and originating from studies of the activity of perception, has been to alter the perspectival “values” of musical language—in other words, to finally reformulate the question of musical invention via a practice (often dubbed “experimental music”) that excludes no sound material *a priori* that is defined by its qualities, therefore eliminating much calculated organization.

We believe . . . that we must justify this fundamental phase in musical research. It is known that this phase in science, outside of any direct application, aims at the exploration of fundamentals, the eventual revision of postulates, the elucidation of methods. In proposing the study of musical objects prior to their usage (the writing of music, composition), we risk surprising some and discouraging others. . . . We are obliged to ask these questions beforehand: “With what materials does one make music? What is it that we perceive in these materials? In that which we perceive, what role does conditioning play?” [9]

Before giving any “concrete” examples, I would like to present some notions that appear to me important in the framework of these thought processes. These notions position the musician and composer in a perspective that seems radically new in relation to sound and, beyond this, in relation to the musical project itself:

- reduced listening: the attitude of listening to a sound object essentially, without concern for its causes and, indeed, temporarily ignoring them (in more habitual listening, a sound serves generally as both an intermediary for the objects to which it refers and a reflection of the event of its creation). In this attitude of lis-

tening, the sonorous phenomenon takes a new dimension, that of a *sound object*.

- intentional hearing [10]: There exist, of course, several intentions in hearing: scientific, musical/technical (that for example, of a professor of an instrument), musical/artistic (that of a musician), aesthetic (that of a concertgoer), etc. Reduced listening is a form of intentional hearing. To quote Schaeffer,

All objects perceived through sound only exist because of our intention to listen. Nothing can prevent a listener from vacillating, passing unconsciously from one system to another or from a reduced listening to a listening which is not reduced. We can even congratulate ourselves; it is by just such a whirlpool of intentions that the links of information exchange execute themselves [11].

- sound object: the audible phenomenon made coherently whole via the *act of perceiving*, which can be qualified outside of the context from which it is extracted. One carries both a general musical intention and an intention specific to a sound object. The sound object is not the physical object that produces the sound, nor the fragment of magnetic tape on which it is recorded, nor the symbol that serves to notate it.
- *musique concrète*: When Pierre Schaeffer proposed this term in 1948, it was a matter for him of marking a

reversal in the direction of musical workings. Instead of noting musical ideas with the symbols of traditional notation and confiding their concrete realization to recognized instruments, it was a question of welcoming the raw sound from where it comes and of abstracting from it the musical values it potentially contained [12].

- experimental method: According to Schaeffer:

It is true . . . that the problems of composition in *musique concrète* have been, historically, the point of departure of a musical research of another type, which gives as its authority the experimental method; and, reciprocally, that the choice of a living and complex material that is impervious to analysis, and a mode of composition that could only be executed empirically and by successive approximations, can be characteristic of another type of spirit [13].

Schaeffer’s *Le Solfège de l’objet sonore* is the concrete result of Schaeffer’s re-

		execution		
		notes	pulse	iterative notes
mass	tonal	N	N'	N''
	complex	X	X'	X''
	varied	Y	Y'	Y''

Fig. 1. Balanced objects: Proposition for a general electronic instrument schema. This schema shows the different levels the musician can (must) control and the way in which the conception of the instrument—and therefore the playing of the sound itself—is a first step towards musical realization. It also illustrates how the totality of the gestures (that is, the corporal engagement) via a complementary relation with the progression of the sound, is itself an act of musical composition. Here two criteria are indicated: *execution*, which corresponds to the manner in which a sound (energy) is conveyed; and *mass*, the extension of the pitch as tied to the idea of the “fundamental.”

search into musical material; it shows the merit of putting in place a precise terminology, thus manifesting criteria of differentiation and comparison in sound phenomena. This *solfege* is articulated in two parts: a typological table and an ensemble of morphological criteria [14].

The nine-entry section of the table illustrated here, entitled “balanced objects” (Fig. 1), centers itself around two criteria posed jointly to the ensemble of sounds: *execution*, which corresponds to the manner in which a sound (energy) is conveyed; and *mass*, the extension of the pitch as tied to the idea of the “fundamental” (i.e. the lowest component of a sound’s spectrum), which simultaneously takes into account both timbre and pitch, the latter of which can be defined as the manner in which a sound occupies the frequency spectrum.

The seven morphological criteria and the three main categories under which they fall are

1. sound fabric [15]: mass, harmonic timbre and grain
2. form: dynamism and motion
3. variation: mass profile and intensity profile.

THE USTs: SEMIOTIC TEMPORAL UNITS

Semiotic Temporal Units (USTs) [16]—which my colleagues and I at the Laboratoire Musique et Informatique de Marseille (M.I.M.) conceived of and have researched for some years—are fragments of sound types (ranging in duration from $\frac{1}{20}$ of a second to 3 or 4 seconds) that can be isolated from their musical contexts by force of the unity of character they have (or appear to have) in relation to their temporal signification and—importantly—that conserve their temporal signification when outside of their contexts.

By “temporal signification,” I mean the evocation of these sound fragments of a sensation or image bound to the experience of time passed (manifested by, for example, either an experience involving muscular tensions or an observation of the movement of objects).

Our research originated in two hypotheses, eventually combined, that were born from the practice of musical composition and instruction:

1. While there may exist an important reservoir of explanations, reflections and theoretical research on rhythm in music, an equivalent for music employing a “smooth time” [17] (e.g. electroacoustic music) does not exist to our knowledge, even on a small scale. Even Schaeffer’s research leaves little room for the specifically temporal aspect of a sound object (apart from the criteria of variation). Even the term “object” is rather revealing in this respect, casting aside ideas of movement and evolution in favor of fixed criteria.

2. Within an educational context as regards electroacoustic music, we can postulate that a given assemblage of sounds (or sound objects) eventually finds coherence and merges into a structure that passes beyond simple enumeration in the same way that a melody constitutes more than a simple succession of notes. In treatises on composition, one finds these structures under diverse names according to their lengths and roles in the composition: motives, themes, propositions, etc. [18]. While in music types in which sound is organized according to pitch (i.e. tonal, modal or dodecaphonic music) one can explain these structures from a technical point of view, a different manner of behavior is called for in electroacoustic music, where only intuition and practice dictate what works and what does not.

After an initial attempt at responding to these studies, we posited that models of organization issued from everyday life might be useful to implement in the domain of sound. Relating to sound via these “typical” experiences of passed time, one could, for example, cite everything in the domain of gestures or the domain of a characteristic progression: e.g. when something in a sound object seems “suspended” or “pushed forward,” etc.

The evolution of this research at the present can be divided into four stages.

The first stage draws from examples that present characteristics of a semantic of time. Our selection of examples has been subject to only two rules: (1) to not limit ourselves to a particular repertoire (i.e. contemporary music or electroacoustic music) in order to maximize historical, stylistic and geographical options and (2) to base our choices of sound examples solely on listening rather than notation.

In the second stage, we searched for commonalities between the examples in order to recategorize those that present identical or nearly identical signification.

tion, with the intention of constructing an initial typology.

The first and second stages have evolved in relation to each other, with the collection of groups of examples compelling us to justify the creation of a new category, while the existence of any given category has tempted us to find examples appropriate enough to integrate into it. Gradually, we have arrived at a total of 19 categories [19].

For each category, we realized a “descriptive index” based on a specific model that details the morphological and semantic characteristics of USTs (see Appendix).

The third stage, simulation, resulted from our concern about the possible over-generalization of our initial discoveries. It is, quite simply, a method of either more completely describing USTs through the realization of sound examples or refining and clarifying the determining morphological criteria of each category.

We formulated the initial, principally morphological descriptions in a transverse manner by noting all the common characteristics of the samples grouped in a category. This manner of working left doubts as to a more general validity of the concepts: are all of the morphological characteristics of each of the UST categories contained in the descriptions of the sound samples? Can we, through these samples, define the means of realizing any given temporal semantic?

Consequently, during the simulation stage, we attempted to respond in the following ways:

1. We established minimum conditions for aspects common to all the sound extracts through a particular sonorous configuration in order to reveal initially ignored details that proved to be determinants at the moment of categorization.

2. We attempted to determine the varieties of established morphological criteria and to eventually stress the similarities between diverse semantic types.

We have executed this work experimentally by carefully applying the initial morphological descriptions to the examples in order to enable sound categorization. Because the initial results obtained rarely corresponded to the original pattern from which the rules had been drawn, we became aware of both the imprecisions and gaps in these initial descriptions and the errors in the splices of the USTs [20].

All of the strategies put to work by the composer—in hopes of realizing a model close to his or her original vision—serve to supply and refine the system of categorization.

To increase the credibility of our findings, we conducted this work as a small group of five or six persons; given the essentially qualitative character of the research and the resulting limitations on “objectivity,” we found it necessary to confront and merge several subjective judgments in order to solidify our choices. We kept the group small for reasons of efficiency; small group discussions elicit a greater likelihood of arriving at a common choice. We are presently undertaking a study into the validity of this research through testing it on a considerable number of “uninformed” listeners.

SOUND FABRIC AND TIME

In music, we usually distinguish the domain of sound fabric (timbre, color) from that of shape (duration, rhythm, time). An attentive listening can reveal in the sound fabric itself a marked temporal character—tied, for example, to a notion of speed, lightness or heaviness—that can serve to differentiate two sonorous “colors.” In the following examples [21]—all of which consist of unique, held (absent of rhythmic character), non-evolving (formless), homogeneous sounds—we can perceive differences in temporal modalities that are doubtlessly also tied to a semantic (for example, hesitant, timid, majestic, etc.).

THE “FEEL” OF SOUND

When one mentions the term “instrument” in the area of electroacoustic music, one thinks, more often than not, of an instrument on stage—a convention that (both in the scope of “mixed” acoustic and electronic or purely electronic music) aims for a spectacular effect that music on tape or compact disc does not have.

In systematically comparing electroacoustic music to “live” instrumental music, one tends to neglect the fundamental, revolutionary possibility of the composer intervening directly on sounds as sonorous phenomena at the very moments they develop and establish themselves in their durations, and, therefore, the possibility of constructing, developing and articulating a musical idea of the “sensation” of the dura-

tion as opposed to an abstract logic of “structure.” These techniques closely interweave sound material with the compositional process insofar as the two are engendered simultaneously and propose a new relationship between the material and its organization.

It is a bit early historically speaking to attempt to formalize these new relationships. But we may formulate a manner in which to fabricate musical works as experiences in time rather than as constructed *objects*.

In this perspective, the relationship between the elements that compose the work and the work itself are deeply modified. For certain pieces, the music stays the same after the relationship changes, even if its compositional elements change.

It has become necessary to reconsider the notions of rule, organization and chance via the “values” of the music (flux, dynamic forces, movements of energy, etc.) conceived through these notions, as well as our relationship to notation in order to definitively eliminate the confusion between symbol and reality [22].

In this sense, conceiving of an instrument implies fixing the constraints, passageways, possibilities and impossibilities of the material, and the manner in which to play it; therefore, such conception already constitutes an engagement in musical composition.

RULES AND THE HAPHAZARD

The new aspects of musical material evoked so far in this article necessarily entail new musical practices and, beyond this, new musical *values*. Sound material, the possibilities of intervention on this material, and musical imagination are tightly interwoven and bring up issues that I would like to address here, starting with the idea of “rules and the haphazard.”

Traditionally, a musical composition relies on a certain number of explicit rules that make up part of the foundation of the coherence of the work [23] insofar as they clarify the relations between the components of the musical material and guarantee a *strictness* in the labor of composition.

Without a doubt, the particular relationship in the West between musical work and its written score marks a clean distinction between the composition and its interpretation: for example, a Mozart sonata exists outside of all the

ways one could interpret it, just as all those possible interpretations will never totally exhaust that sonata.

The Reference Is the Written

Western musical culture—concerned as it is with the nature of composition, calculation, hierarchy and the organization of sound material as it is decomposed into parameters (pitches, timbres, intensities, durations, etc.)—depends on rules, while interpretation is bound to contingencies (such as chance) that do not profoundly affect the sense of the work.

However, I should clarify that the relationship between composers and rules can be quite different with contemporary music forms, especially since both the notion and the role of the rules of composition have evolved considerably during the twentieth century, notably through “scientifically” formalized structural models resulting from the desire to construct a new musical language. During previous eras in which musical language was more conventional, the relationship of composers to the rules was a matter of an acquired communal consciousness which was used quasi-unconsciously as a spoken language.

Another way to establish rules is to refine them in hindsight (which occurred in the treatises of Jean-Paul Rameau and J.J. Fux—the latter of which served as the basis for the realization of the pioneering electronic piece, *Illiad Suite* [24]). These rules have appeared, then, as constants in a conglomeration of works appearing at given moments.

The Evolution of Musical Thought through Practice with New Sound Material

Certain twentieth-century composers (for example, John Cage and American practitioners of “repetitive” music [25]) have left a considerable part of their compositional work to chance, thus opposing themselves to certain forms of determinism (serialism, for example).

Determinism and chance are not merely two compositional concepts—they are two diametrically opposed processes of invention. Determinism represents a system of extremely tight functional relations between structural “objects,” while chance consists of the composer setting processes in place while assuming an attitude of “non-intent” [26].

One concept worth noting here is that of “open composition,” where the notion of rules does not circumscribe the

work and where one leaves an open door to the modification of certain parts (notably the order of events) of the work.

Even if the principle of indeterminacy considerably modifies the notion of a musical work, the composer’s place in the work [27] and the rules of the work (rules of organization or simple instructions that allow the work to end up at an unforeseeable result) are conceived together as an object in which the musical sense exists through the organization of the elements that form it prior to and independently of its realization (with the notable exceptions of event-oriented improvisations and performances, etc.). The written work (as opposed to the recorded) exists always as a “promise of sound”:

Simple note, element figured by a point or a line, thick lively note which is inscribed dot by dot and intentionally measured out in various curls like thin rays of light producing the touch of color necessary to produce some volume from the interior, it is nothing, that which should not be favorable to the scintillating movements of diverse bearings. Paper can never show these sparkling speeds; it promises them, implies them [28].

It is well inside this field of movement—or better still, inside this field of experienced duration—that musical thought can exercise itself presently.

As I suggested earlier, ours is a world of qualities rather than quantities (how does one quantify a brushing, a crack or a sparkle that simply *is*, sounds that can only by comprehended as animate?). By way of the technologies cited above, these phenomena bound to the life of sound become the values on which musical thought can establish itself. The notions in music of chance, rules and concepts—along with the tools that permit one to conceive musically (that is, to explain, comprehend and be sensitive to music)—must be reenvisioned [29].

It could even be said that taking into account sonorous experience as one of the foundations of musical composition significantly blurs the distinction between composition and improvisation.

The question of the relationship between rules and the coherence of a work poses itself as well: must one clearly perceive a piece’s modes of organization or can one claim the work is instead intuitive and immediate? Similarly, can one intuitively (notably in terms of empathetically “feeling” the sound fabric’s movements and evolution) fabricate a musical work?

Music critic Jacques Lonchampt wrote about Pierre Henry’s *Variations pour une porte et un soupir*:

This work, elaborated sound by sound, assembled centimeter by centimeter, seems on the contrary a flowing which is continued and without restraint [30].

and of Pierre Henry’s *Voile d’Orphée*:

What is striking is that, from the beginning of *musique concrète*, the composer has thus reinvented everything: the mystery of the orchestral fabric, broad and complex motion, the polyphony of rhythms and sound trajectories obey no known rules whatsoever and nevertheless attain a unity, an incontestable internal logic [31].

The following examples illustrate that the problem of composition has been shifted and that even the idea of what a rule of musical composition is must be rethought [32].

Interpretation as Rewriting

We find an example [33] of interpretation through rewriting of a composition when comparing two versions of “My Favorite Things” by Rogers and Hammerstein: the original version sung by Julie Andrews on the soundtrack of the film *The Sound of Music* and the version by John Coltrane. It seems clear to me that the musical sense of these two versions is so different that the notion of “interpretation” is not sufficient to describe the differences between them. Conversely, “objective” notions such as melody or harmony are not sufficient to support a strong identity for the composition, which would then allow the versions to be considered as two different forms of the same piece (somewhat like the way a sonata of Mozart exists beyond all the interpretations done and those even to come).

The Coltrane version is a veritable rewriting of the piece (a labor of actual musical creation rather than a mere interpretation) operating in the domain of sound art, in the manner of making the sounds *exist in time*.

Elaboration of a Duration by Processes

The elaboration of a duration by processes refers to the development of the sound fabric itself (which entails a certain type of empathetic listening) when it takes on a determinant importance in the piece’s musical development as a whole. Examples include François Bayle’s *Tremblement de terre très doux*, Michel Philippot’s *Ambiance 1* and Olivier Renouf’s and my *Mare rubato*.

Dissecting these sound sequences into discrete elements would be both impossible and totally arbitrary (one could effectively isolate fragments of each recording, but this would not have any musical interest). One can speak of musical *organization* in the absence of discrete elements, knowing perfectly well that the duration of the musical fragment is sufficient for something musical to happen. The above pieces represent typical examples of experienced aural duration into which one must “sink” in order to seize their musical sense. Musical sense can be found in the remembrance of an experience lived as fluctuating forces or tensions felt during the progression of sound. We are quite simply confronted with the impossibility of later reconstructing a duration as a succession of ordered elements.

The Natural Model

In the natural model, the evolution of sound events is referenced in the constitution of musical forms. An example is François-Bernard Mâche's *Kassandra*. In this example, what is understood musically is most important here, from the particular way in which the sound fabric evolves over time to its musical sense, which appears in terms of motion and energy.

Composition for a Certain Kind of Sound Fabric and Articulation

An example of this kind of composition is Karlheinz Stockhausen's *Aus den Sieben Tagen*. This work is a proposition in the form of a text that acts as the fulcrum of the musical realization of the piece.

Flight Toward the Sun

Play a sound until you hear
each of its vibrations
Hold it
and listen to the sounds of the others
all together, not separately
and drive your sound, slowly
until you reach a perfect harmony
and all the sounds become gold
pure fire, quietly glowing [34].

Instruments or Instrumental Possibilities as Elements of Composition

Examples of this type of composition include Jean Dubuffet's *Expériences Musicales* and my *Étude No. 4 pour synthétiseurs pilotés par une guitare électrique*.

These examples (which no doubt demand deeper analysis) have in common a modification of musical thought that comes from the awareness of a complex sound reality that is impossible to reduce to certain parameters.

This brings up a new way of thinking about musical composition and, no doubt, other “rules” that would act as “filters” that provide some axes of consistency rather than as means of construction, by establishing relationships between discrete elements.

Since my aim for this article is to indicate tracks of reflection leading to a new approach to music—and especially to musical creation—it would probably be somewhat premature to try to give definitive conclusions.

The difficulty is to remain critical enough towards commonly accepted values so as to be receptive to the innovative vigor of the practice of live music. We must also accept that, as is to be expected, formalization lags somewhat behind practice.

In other words, and without being pompous, we at MIM wish to provide the means of observing music as it is actually made.

APPENDIX

Each UST is defined/described by an index that details morphological, semantic and other pertinent characteristics. The “Fall” UST category is described by its:

1. Global morphological description: “Fall” units manifest their specific semiotic as sound patterns that distinctly begin and end in time, and are composed of two successive phases. In the first phase, they appear globally uniform, even if there is movement within the substance matter. In the second phase, there is an acceleration and modification of the pitch, resulting in the pitch either rising or falling.

2. Semiotic description: “Fall” units may be characterized by an unstable balance that is apt to break; a state of suspension followed by a sudden overturn (only after which can one become aware of the suspension); or a loss of potential energy which is converted into kinetic energy.

3. Other pertinent characteristics: The second phase cannot evolve evenly; it may comprise an acceleration but not necessarily a variation of pitch. The passage from phase one to phase two is not gradual, but triggered by a sudden change (“angular point”). A continuity of the aural matter (though not necessarily the identity of the matter) is required between the two phases. There is a recognizable “it” that is common to both phases. The total duration must not exceed more than several seconds if

it is to be perceptibly integrated as a form.

References and Notes

1. For example, computers enable the rapid realization of sound clips and the printing at home of one's scores and the realization of recordings of excellent quality. Communication software such as compact discs and compact disc-read only memory units (CD-ROMs) have also assisted the efficiency of sound recordings.
2. I am speaking in a large sense here. We should remember that *musique concrète* was born in the environment of the studios of radiophonic creation.
3. Pierre Schaeffer, *Le Traité des objets musicaux* (Paris: Editions Seuil, 1966) p. 23 (translated by Pascal Gobin).
4. Magnetic tape allows for tape reversal, modification of tape speed and extraction of sound fragments.
5. Here, I am referring to musical realization, but one could successfully apply this notion to other artistic forms.
6. Schaeffer [3] p. 471 (translated by Pascal Gobin). For more on “reduced listening” see Pierre Schaeffer, *Le Solfège de l'objet sonore* (Paris: Editions Seuil, 1966).
7. Regarding the importance of timbre, see *Art of the Fugue*, a series of compositions for which J.S. Bach did not indicate the effective instruments.
8. Apart from certain isolated attempts (including Arnold Schoenberg's notion of *klangfarbenmelodie*, or “tone-color melody”) the term “timbre” appeared at the moment of the realization of atonal music and was very quickly incorporated into systems based on pitch organization (modes, dodecaphonism, polytonality, etc.). See also the musical works of Luigi Russolo and, in another order of ideas, those of Edgar Varèse.
9. Schaeffer [3] p. 360 (translated by Pascal Gobin).
10. “Let's affirm that one hears that which one has the intention of hearing.” Schaeffer [3] p. 140 (Translated by Pascal Gobin).
11. Schaeffer [3] p. 343 (translated by Pascal Gobin).
12. Schaeffer [3] p. 23 (translated by Pascal Gobin).
13. Schaeffer [3] p. 22 (translated by Pascal Gobin).
14. For details on the *solfège*, see Schaeffer [3] pp. 475–597; or Michel Chion, *Guide des Objets Sonores* (Paris: INA-GRM Buchet/Chastel, 1983).
15. “Sound fabric” is derived from the French term “matière sonore.”
16. In French, *Unités Sémiotiques Temporelles*. See Laboratoire Musique et Informatique de Marseille, eds., *Les Unités Sémiotiques Temporelles, éléments nouveaux d'analyse musicale* (Marseille: MIM, 1996).
17. In his book *Penser la musique aujourd'hui*, Pierre Boulez established a distinction between two concepts of musical time, “smooth time” and “sliced time,” which has proved very pertinent to this type of discussion and has been referenced often since then. See Pierre Boulez, *Penser la musique aujourd'hui* (Mayence, Germany: Schott's Schöne Mayence, 1963) p. 471.
18. See Arnold Schoenberg, *Fundamentals of Musical Composition* (Los Angeles, CA: Estate of Gertrude Schoenberg, 1967).
19. The 19 USTs presently are: fall, inexorable course, contraction-extension, surge, expansion,

floating, braking, drifting due to divergent data, heft, obsession, moving forward, turning, ready to move, drifting due to an excess of data, suspension-interrogation, poised, in waves, motionlessness and impulse-propelled. The name of each category (and so of each UST) should be understood as a generic term permitting a rapid identification of any given category. Furthermore, any one term serving to designate a category should not be assumed to necessarily possess a semantic meaning tightly bound to the USTs themselves; if the word "fall" is employed to designate one UST, it does not mean that the sound examples contained in this category must retain all of the meaning of the word "fall."

20. This has been, for example, the case of the "Fall" UST, which we summarize in *Laboratoire Musique et Informatique de Marseille*, eds. [16]. We perceived in effect that the meaning of "fall" was much stronger as we integrated in the UST an "initial phase" that evolved very little and which had, at first, appeared as a contextual element.

21. These are available to listen to on the MIM web site <<http://www.cosa-mentale.fr/mim.html>>.

22. Regarding this type of confusion, I remember attempting to analyze durational relationships in terms of proportions between parts of a work (a characteristic example being the clichés in the works of Bartók) by counting the notes in the score.

23. Moreover, these rules often have validity for only one work.

24. Conceived by the American composer Lejaren Hiller, *Illiad Suite* was realized by a computer that had been "taught" the rigors of counterpoint set forth in Fux's treatise; this work was later transcribed for string quartet in 1958.

25. On the subject of repetitive music, see Daniel Charles, "La musique et l'oubli," in *Le Temps de la Voix* (Paris: Jean Pierre Delarge, 1978).

26. The term is borrowed from the title of an article by Eero Tarasti, "Cage et la modalité du non-vouloir," *Revue d'Esthétique*, Special John Cage edition, Nos. 13–15 (1988).

27. See Daniel Charles, *Glosses sur John Cage* (Paris: UGE, 1978) pp. 74–75.

28. Claude Ballif, "Idéalisme et matérialité," *Revue Musicale* 290 (Paris: Richard Mass, 1972) pp. 5–11.

29. This is the essence of the work on the USTs conducted at the MIM.

30. Jacques Lonchamp, liner notes to Pierre Henry, *Variations our une porte et un soupir/Voile d'Orphée*, Harmonia Mundi CD (HMC905200) (1987).

31. Lonchamp [30].

32. This whole discourse only has the value that one accords in that in these works, which do not obey certain rules, one can sense intent, coherence, even "logic." See Jacques Lonchamp [30].

33. These examples are accessible on the MIM web site at <<http://www.cosa-mentale.fr/mim/frarec.html>>.

34. Karlheinz Stockhausen, *Aus den Sieben Tagen*, Musique D'Abord CD (190795) (translated by Pascal Gobin).

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More information in relationship to this text is accessible on the web site for the Laboratoire Musique et Informatique de Marseille (M.I.M.) <<http://www.cosa-mentale.fr/mim.html>>.

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