



## To Be and Not to Be: Aspects of the Interaction between Instrumental and Electronic Compositional Methods

Flo Menezes

*Leonardo Music Journal*, Vol. 7. (1997), pp. 3-10.

Stable URL:

<http://links.jstor.org/sici?sici=0961-1215%281997%297%3C3%3ATBANTB%3E2.0.CO%3B2-E>

*Leonardo Music Journal* is currently published by The MIT Press.

---

Your use of the JSTOR archive indicates your acceptance of JSTOR's Terms and Conditions of Use, available at <http://www.jstor.org/about/terms.html>. JSTOR's Terms and Conditions of Use provides, in part, that unless you have obtained prior permission, you may not download an entire issue of a journal or multiple copies of articles, and you may use content in the JSTOR archive only for your personal, non-commercial use.

Please contact the publisher regarding any further use of this work. Publisher contact information may be obtained at <http://www.jstor.org/journals/mitpress.html>.

Each copy of any part of a JSTOR transmission must contain the same copyright notice that appears on the screen or printed page of such transmission.

---

The JSTOR Archive is a trusted digital repository providing for long-term preservation and access to leading academic journals and scholarly literature from around the world. The Archive is supported by libraries, scholarly societies, publishers, and foundations. It is an initiative of JSTOR, a not-for-profit organization with a mission to help the scholarly community take advantage of advances in technology. For more information regarding JSTOR, please contact [support@jstor.org](mailto:support@jstor.org).

# To Be and Not To Be: Aspects of the Interaction Between Instrumental and Electronic Compositional Methods

*Flo Menezes*

**A**lthough instrumental music perhaps constitutes an irreversible genre of composition, nowadays many composers tend to view composition via electronic means as a powerful resource and a crucial aspect of their music. This is also the case in my own work. Since my first attempts at creating electroacoustic music as a guest composer at the Studio für elektronische Musik at the Cologne Musikhochschule, where I worked from 1986 to 1990, my compositions have centered essentially on the interaction between instrumental writing and electronic resources. This was one of the reasons that in 1994 I founded the Studio PANaroma de Música Eletroacústica [1] at the State University of São Paulo (UNESP) in cooperation with the Santa Marcelina College (FASM), one of the most significant Brazilian centers for research and composition in electroacoustic music. Students who have access to the studio must have studied instrumental composition prior to their first experiences with electroacoustic means.

My musical language, as exemplified in *Parcours de l'Entité* (Trajectory of the Entity) (Fig. 1), cannot be understood or described without first discussing certain aspects of my conception of the general implications of electroacoustic music on musical thought [2].

## THE STATUS OF MUSICAL MATERIAL IN ELECTROACOUSTIC MUSIC

As is not the case in instrumental music, the composer of electroacoustic music is directly confronted with sound phenomena, without the mediation of a figural representation of sound, such as a written musical score. This fact gives rise to many substantial differences in the approaches to musical composition.

Musical writing (notation) was born as a graphical representation of verbal prosody, as can be observed by studying the early vocal music of the Middle Ages. As a consequence, it emphasized the construction of a notation devoted to intervals and durations. Notation has historically allowed the composer to compartmentalize sound through graphic symbolism. The arrival of musical writing contributed incisively to the semiotic delimitation between verbal and musical languages, because it placed emphasis on aspects that verbal writing, its older sister, ignored. As we know, verbal writing centers around the summary representation of vocalic timbre and was based on the

primordial binary opposition between vowels (sounds with determined pitches) and consonants (noises). Such compartmentalization of musical notation was responsible for a considerable amount of abstraction in the presence of raw sound, which is in itself a *totality* of aspects. The articulation of such sound parameters (basically, pitches and durations) has made possible the construction of what we can designate as musical *composition* proper: in fact, to *compose* signifies in essence the *recomposition* of sound parameters—durations, pitches, intensities, timbres (which have been historically compartmentalized by musical writing)—into an organic whole.

Such elaborated articulation of elements in musical time is generally called *musical material*. The material is therefore posterior, or subsequent—derived from the musical writing itself—and essentially takes on, in instrumental music, a relational character. This means that the essence of musical material in instrumental music, as originated by musical writing, reveals the interdependence between structural elements that constitute musical form.

In electroacoustic music, on the contrary, musical material acquires a double function: on the one hand, it preserves and develops its relational character (although now independently of a notational process), in that it continues to elaborate the temporal discourse of musical form as a correlation of the elements with which it orders the time; on the other hand, musical material is introduced into the constitution of the sound spectra themselves. Therefore, electroacoustic music, unlike instrumental music, first constitutes its own sounds. Thus, the functions of musical material in electroacoustic music are, in one sense, *relational* and, on the other hand, *constitutive* in character. While in written instrumental

### ABSTRACT

The author provides an overview of the many consequences that the arrival of electroacoustic music has produced on musical material and discusses the advantages of an interaction between manifest instrumental and "subject" electroacoustic writing. By *writing*, the author means the compositional processes themselves. His discussion ranges from the use of particular harmonic techniques to the revolutionary role that time expansion plays in obtaining a deeper perception and evaluation of the sound phenomena. The author uses some of his works to exemplify the compositional aspects discussed.

Flo Menezes (composer), Alameda dos Guainumbis, 1435, 04067-003 São Paulo SP, Brazil. E-mail: <flomenez@uol.com.br>

This article is part of the *Leonardo* special project entitled "A Radical Intervention: The Brazilian Contribution to the International Electronic Art Movement," guest edited by Eduardo Kac. The project consists of a wealth of information in the form of a gallery, chronologies and a series of articles published in various issues of *Leonardo* and *Leonardo Music Journal* and on the *Leonardo World Wide Web Site* (<http://mitpress.mit.edu/e-journals/Leonardo/home.html>).

Fig. 1. Page 4 of the score for *Parcours de l'Entité*, a composition that exemplifies the author's musical language.

music the material originates from the writing itself, in electroacoustic music the material precedes, in part, the process of composition in so far as the material involves the spectral constitution of the sound and is partially *derived* from the actual relational work of composition in the studio. Thus, the material emerges partially from derivative processes (manipulations of sound in time, mixing, etc.) regarding form, which are, in any case, also essential to electroacoustic compositional elaboration. Considering that any and all electroacoustic elaboration passes inevitably through the procedures of *synthesis*, through those related to *treatment* (for instance, filtering, transposing, time stretching and time compression, shuffling and montage techniques) or—as has been the case of the great majority of works composed in studios—through both types of procedure, we can testify that the musical material is, in its constitutive character, subsequent to the synthesis and prior to the treatment. At any rate, musical material will always constitute the a priori condition of compositional elaboration. Such compositional elaboration in the studio—elaboration that renounces the decoding processes of

traditional musical notation without renouncing the relational aspects of the musical material—I call *latent* or *subjective* writing.

### LATENT WRITING IN ELECTROACOUSTIC MUSIC

In the absence of notation or notational abstraction in the studio, the composer nevertheless is not free from compositional elaboration. Indeed, every quality composition, be it instrumental or electroacoustic, shapes itself according to the *escritural* or writing-based elaboration of its structures. In electroacoustic music, the writing exists, thus, in a latent state. We are faced with a kind of *subjective writing* that permeates speculative thought in the studio.

In fact, such latent writing tends to regain, in the core of electroacoustic activity and in its confrontation with raw and concrete sound, the abstraction that is typical of instrumental writing, as demonstrated by its long history. In this context, one of the most relevant aspects of electroacoustic composition is, as has been shown by Stockhausen [3], *sound decomposition*. Just as instrumental writing implies the compartmentalization of

sound parameters, this segmentation is regained in the electroacoustic studio, above all, through the procedures by which the sound is treated, through which the *sound object*—to employ the expression so beloved by Schaeffer [4]—unveils its many distinct facets.

In the course of this process of decomposition/composition of sound in the studio, the composer acquires an even sharper perception of the internal life of sounds. The composer's awareness of the relationships of structural elements is accompanied by a perception whose end result is an effective and constitutive introspection into the sound spectra. This means that the perception concerned above all with formal relationships is corroborated by a continual *textural* comprehension of the objects. At the core of the process of constituting sound texture, the formal relationships will thus infiltrate as elements of the musical structure. In this way we arrive effectively at the essence of the spectra, having thus effectuated a substantially qualitative change (as compared to instrumental music). With this change, musical time itself is considered as a relational and constitutive aspect of the musical material.

## FROM THE SOUND OF TIME TO THE TIME OF SOUND

I think that, in the course of the short history of electroacoustic music, we can perceive a gradual and symptomatic shifting of interest in sound perception regarding time. After experiments with cutting and montage of analog tapes, through which we perceive the prominence of the attack in the perceptual evaluation of sounds—experiments that culminated in Schaeffer's theoretical exposition on *temporal anamorphosis*, in which he exposed the proportional relevance of the attack as compared to the duration of sound (the shorter the sound is, the greater the importance of its attack) [5]—there tended to be an increased consciousness of what Stockhausen has called the “unity of musical time” [6]. Through Stockhausen's theory, composers gained knowledge of the fact that frequencies and rhythms are nothing more than differentiated degrees of the same process, concerning the organization of the duration of vibrations on the microstructural spectral level. Gradually, through an increased awareness of the *attack*, a more clarified perception of the *sustain* of sound came about.

I think that the electroacoustic experience thus caused a real revolution in the heart of the musical conception of time and exposed a bipolarity from which no aesthetic attitude related to composition can escape: either one considers sound as a constitutive part of musical time and pays more attention to attacks and to metric/rhythmic organization, or, on the contrary, one considers sound as a textural phenomenon, and places emphasis on the perception of time as a constitutive element of the sound spectrum. The first posture will inevitably be associated with instrumental writing, which does not allow a radical compositional intervention into the constitution of the sounds themselves. The second will, in turn, constitute a typically electroacoustic stance, in which one enters into the internal temporal relationships of the spectrum.

In this way, electroacoustic music liberates the composer from articulatory impositions of a metric/rhythmic character, giving rise to an essentially *textural* organization of musical time. Sound that was of time gives way to the time of sound.

In my work, such a reflection on time is responsible for constructions devoted to the interaction between instruments and electronics, even when I compose

for percussion instruments—that is, for those instruments strongly related to rhythmic aspects. *A Dialética da Praia* (The Dialectic of the Beach) (1993), for 70 percussion instruments (played by two musicians) and tape, reveals this preoccupation [7]. Although I use practically all the kinds of percussion instruments there are in this piece, I have never made any concessions to rhythmic or metric configurations. Alluding to the statistically rich diversity of sound and the highly complex sound phenomena of the beach, the piece elaborates a trajectory in which a textural perception predominates, in spite of the rhythmic figures that could eventually be suggested by the instruments used. In fact, in this work, the notion of the sound *grain*, as exposed by Schaeffer in his typological study on spectra [8], is much more prominent than the simple appeal to metric structures.

### PRONUNCIATION-FORMS

If we consider my work from the point of view of this textural perception of time as a constitutive element of sound, the time-stretching of spectra emerges as one of the most typical of my procedures.

From this perspective, and in alliance with my preoccupation with the phonological expressiveness of the spoken word, I have elaborated what I call *pronunciation-form*, the most definitive results of which have been reached since 1986 at the Cologne Studio. One of the most radical examples is *Phantom-Wortquelle; Words in Transgress* (Phantom-Word-Source; Words in Transgress) (1986–1987), a purely electronic piece based entirely on sounds derived from the human voice [9]. In *PAN: Laceramento della Parola (Omaggio a Trotskij)* (PAN: Laceration of the Word [Homage to Trotsky]) (1987–1988), a piece for tape alone (the first version of which was composed in 1985 for orchestra and tape), the role of the pronunciation-form is also crucial. This composition marks my first attempt at deriving an entire musical form from the phonological structure of a given word, a process that I denominated subsequently as *Aussprache-Form* (Portuguese: *forma-pronúncia*; English: *pronunciation-form*) while working in Cologne. In what simultaneously becomes a formal, musical and verbal procedure, a given word whose meaning seems to be relevant to the concept of the piece is radically extended in time, in a concrete or imagi-

nary way. Its phonological moments, as defined in structural phonology, are consequently lacerated, thus determining essentially the succession of the sound textures that constitute the musical form. In this process, both the proportions of durations and the sound characteristics of the phonemes in the usual pronunciation of the given word are considered in order to elaborate the musical form. For example, the occlusive phoneme /p/ (from the word PAN) does not lose its identity, in spite of its radical extension in time (in this case, the extension becomes resonance). In regard to the vowels, which are characterized above all by their first two formantic regions, I consider both formants and, observing their frequential position in the vocal spectrum, project these formantic regions as contrasting structures in chronological time. For this reason, when Henri Pousseur became familiar with my procedure, he named it *Klangfar-bendauernproportionen* (proportions of durations of timbres) in analogy to the term *Klangfarbenmelodie*. In my music, in fact, time appears mainly as timbristic durations, or, in phenomenological terms (as in Husserl), as extensions of the now (*Ausdehnungen des Jetzt*) [10]. Furthermore, time in my music does not have a metric character, and in this sense I should say that I am greatly influenced by Stockhausen. Contrary to Stockhausen's *Moment-Form*, however, the dramatic succession of the particular “moments” in the pronunciation-form assumes an essential role [11].

### HARMONIC TECHNIQUES: CYCLIC MODULES AND PROPORTIONAL PROJECTIONS

Considering that the musical material of my electroacoustic works is concerned equally with its constitutive side and its relational functions, and also considering that the central point of my work consists, although not exclusively, of the interaction between instrumental writing and subjacent writing in the electroacoustic context, I have developed, both in the electroacoustic and the instrumental domain, certain harmonic techniques with which I have been composing since the mid-1980s. I call these techniques *cyclic modules* and *proportional projections*. Although these constitute autonomous speculative methods of harmony (in its broadest sense), the conjunction of both

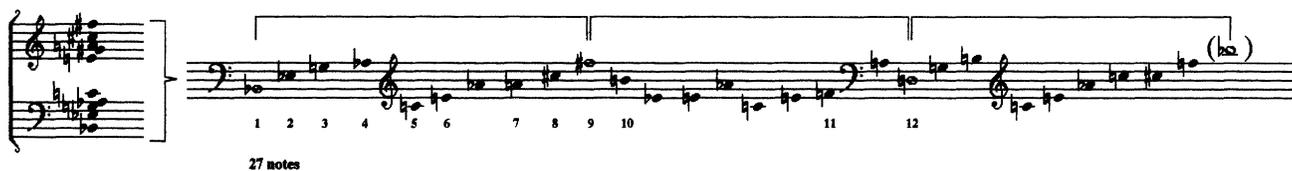


Fig. 2. The cyclic module that serves as the basic structure for . . . *Ora . . .*, *A Dialética da Praia* and *Parcours de l'Entité*.

techniques in the terrain of electroacoustic music with instruments has led me to very satisfying results.

Briefly, a cyclic module is a cyclic and expansive interval field derived from a frequential basic structure, which I designate as a *harmonic entity* [12]. Considering any interval structure—synchronic (as a chord) or diachronic (melodic, sequential)—as a harmonic field derived from a certain interval propagation (from lowest to highest tones, in the case of chordal entities as natural resonance phenomena; from the first to the last tone, in the case of diachronic entities as chronological phenomena), one deduces that every entity is originally circumscribed by the relationship between its extreme notes/frequencies and is internally constituted by the discrimination of the harmonic space consisting of the notes/frequencies that compose the internal space of this interval.

I was interested in developing to the utmost the structuration of harmonic entities. For this purpose, I have projected the proper interval structures of these entities above and beyond the entities' extreme limits. The result of each one of such projections is a limited number of transpositions of a given entity over itself, in which for each transposition, the point of departure is always constituted by the respective last note (either as frequential highest note or as temporal final note, depending on the essential character of the basic entity).

After a certain number of transpositions, one necessarily returns again to the original notes of the entity (regardless of the octave in which these notes are placed). Such a process leads to a cyclic phenomenon and thus constitutes a module with recurrent notes in which the number of transpositions is determined by the interval in the octave between the extreme notes of the basic entity. As each note of a new transposition will serve doubly in the constitution of the module (as the last note of a transposition is the same as the first note of the next transposition), the total number of notes in the cyclic module will thus be determined by the following

equation: the number of possible transpositions multiplied by the number of notes of the entity, minus the number of possible transpositions. Although many entities can present the same characteristics, each one will be responsible exclusively for the constitution of its own module and no other. Each module will therefore be constituted basically from the internal structure of the harmonic agglomerate (entity) and will be typical of its own entity, but not of any other, constituting thus the specific *harmonic field* of its basic entity. The delimitation and the density of the modules are thus directly derived, respectively, from the interval between the extreme notes of the entity and from the entity's internal harmonic density. On one hand, the internal interval connections (particularly the transitions between the transpositions), the recurrence of certain notes and the harmonic structures that are derived from the selective and periodic operations in the temporal evolution of the module presented uninterruptedly make the cyclic modules highly interesting structures as speculative organizations of pitch. On the other hand, by means of expanding the original field of the basic harmonic entity, such modular structures curiously reveal, at times, certain correlations (such as identical notes and intervals) between entities or *harmonic archetypes* (that is, harmonic structures that are present in distinct phases of history—including the history of our century—independently of the harmonic systems in which they appear) that could never have been foreseen by the composer before the constitution of the cyclic modules. The modules thus enhance the potency of the identities as well as the peculiarities that are in a latent state in the harmonic entities themselves. It is as if we make a paraphrase of the Cartesian premise: the essence of an entity is revealed by its extension.

Curiously, many cyclic modules complete the total chromatic tempered space at the moment of their last note before completing their own cycles, while others obtain the total chromaticism exactly on the pivot-note from the

last transposition of the entity. This last scenario is the case of the cyclic module that serves as the basic structure for . . . *Ora . . .* (1991-. . .), a work in progress for orchestra, as well as for *A Dialética da Praia* and *Parcours de l'Entité* (1994) for amplified flutes, metal percussion and digital tape [13] (Fig. 2).

Although the cyclic modules lend themselves to a careful and multiform elaboration of harmonic structures in the spatial terrain of the tempered system, they must nevertheless not be circumscribed exclusively to instrumental music. I employ this technique—as structures of intervallic proportions in cyclic expansion—in the electroacoustic context also. For instance, in *A Dialética da Praia*, the module served as the structuration of profiles made from processed, sampled percussive sounds.

In addition to being interested in the possibilities offered by the modules, I was also interested in the construction of a method for intervallic manipulation that would permit me to transpose, on the level of the harmonic space or dimension, the variations of perceptive dimensions that are typical of the operations that one can make on the temporal scale and that are free from metric or rhythmic impositions—i.e. dilation and compression of durations. Dilation and compression of durations would be converted, in this case, to expansions and contractions of interval structures. If elaborated in both directions, the new technique thus would differ from that used to form the modules, because these modules are used exclusively and necessarily as an "enlargement"—that is, as an expansion of the harmonic field of the original entity.

I use the term *proportional projection* to refer to the projection of the intervals of a given harmonic tempered entity—an entity that occupies a certain range, according to a logarithmic subdivision of pitches—to differentiated extents, preserving, however, the same original interval proportions of the entity. If one considers that the tempered system subdivides the harmonic space based on the ratio of 1.0594 for the minor second,



discriminated degrees = 11 16 8 9 1 5 21 10 14 19 12 4 17 21 1 5 18 10 15 8 24 13 17 9 25 14 6 23

Fig. 3. Discrimination of degrees made by the main profile of the cyclic module in *Parcours de l'Entité*.

one can deduce that the expansion or contraction of the harmonic space will cause a non-tempered alteration of the internal subdivision of the new space, occupied by the projected entity. For the calculation of the projections, I again use the logarithmic law, except that the exponent of the root and the ratio for the interval between the first and the last note will be changed [14]. Independent of the direction to be taken by the projection (contraction or expansion), I will always consider two aspects of the basic entity: first, the number of subdivisions in semi-tones that fill the harmonic space between its lowest and its highest note; second, the evaluation of the discrimination between such subdivisions or degrees, thus verifying which frequencies are utilized by the original entity in its original extent (Fig. 3).

In *Parcours de l'Entité* there is a good example of the combination of both harmonic techniques. The cyclic module derived from the basic entity—with its main profile as executed by the flutist (shown in Figs 2 and 3)—is submitted to four contractions via proportional projections. Figure 4 reproduces the table of derived frequencies for such projections, in which the bold-faced numbers in each harmonic space or extent (represented as a column) show the discriminated frequencies, corresponding to the frequencies used in the main tempered profile (fifth column).

After the conversion of the values into traditional musical notation, I obtain as a result a directional expansion of the main profile through five stages (Fig. 5). I employed the process of mixing both techniques in *Parcours de l'Entité* for the elaboration of instrumental writing for the flute, the use of which is concomitant with proportional projections for the spectral constitution of the synthesized sounds, which I made with the computer program Music V and which are present on the tape [15]. This process of mixing both harmonic techniques also served for the expansion of sequenced profiles of FM-synthesized sounds in the last part of the tape in *Profils Écartelés* (Disrupted Profiles)

(1988) for piano and quadrasonic tape, realized at the Cologne Studio [16].

### THE FUTURE OF AN ILLUSION

In my opinion, the great Hamletian dilemma of existence and its antagonistic exclusion, according to which one places in opposition presumably mutually exclusive poles in order to resolve specific problems, has been definitively overcome. Although such an antagonism can survive in social conflicts, which are exposed to the conditions of subsistence and tend sometimes to resolve their problems through exclusivist attitudes, directions in the aesthetic domain point to a greater consciousness of the antinomy present in each communicational linguistic act, regardless of its specific semiotic code.

Roman Jakobson explained in a magnificent manner the antinomy in the core of each sign, in the center of the relationships between the signifier and the signified, which is responsible for the dramatic condition inherent in each communicational act:

The relationship between the sign and the signified object, and particularly between the representation and the represented, the identity of each, which is at the same time the difference between them, constitutes one of the most dramatic antinomies of the sign. This antinomy is unavoidable, because without contradiction there is neither conceptual nor semiotic interplay, the relationship between concept and sign becomes automatic, the course of events becomes paralyzed, the consciousness of reality dissolves [17].

Thus the lemma of today can be summarized as the non-conciliatory coexistence of opponents, the constant doubt that permeates the semiotic dichotomy present in each act of communication, the illusion that is destroyed each moment concerning a presumably undeniable unity of the perceived thing, the richness of the perceptual diversification in the equivocal and propellant drama of the sign, which is present at the heart of each musical gesture as a

sign of musical language—regardless of an eventual representational character and absolutely independent of an external referentiality that would transpose the music beyond its own bounds—and is found in musical structures themselves. To be *and* not to be: that is the condition of our aesthetic actuality.

Particularly where it concerns the relationships between technological means and instrumental writing, electroacoustic music reveals itself as a fertile field for the cultivation of such dichotomies. Opposing the acoustic world to one diffused through loudspeakers—through live electronics, through the concomitant propagation in the acoustic space of pre-recorded musical structures, or even through computer-generated events that are opposed to those derived from instrumental performance—electroacoustic music with instruments materializes as one of the most advantageous modalities of contemporary music.

This is because electroacoustic music produces a dichotomy that is present at the core of both the manifest and subjacent writing of musical composition, pointing in totally different directions. From a spatial point of view there is, on the one hand, the situation of an audience responding to purely instrumental music; on the other hand, there is music as constituted by the solo diffusion of a non-accompanied tape.

When listening to an instrument, one localizes immediately the sounds and their undoubted physical source. Space and its potentialities as elements of musical structure are almost never properly considered by one who listens to the work. The structural question in composition involving spatiality became gradually more pressing in instrumental compositions in the course of our century. Previously—with the exception of some rare examples in ancient musical history—the confrontation of the listener with the live instrument almost never involved the spatial relationship between one who listens and one who plays: the first has always been practically neutralized by the presence of the second. From the vantage point of such a con-

Prop. Proj. I	Prop. Proj. II	Prop. Proj. III	Prop. Proj. IV	Main Profile
between Ab 415 and Eb 622 Hz	between G 392 and F 698	between F 349 and G 784	between C# 277 and A# 932	between C 262 and C 1046 = TEMPERED
<b>415</b>	<b>392</b>	<b>349</b>	<b>277</b>	<b>262</b>
422.36	401.54	361.19	291.55	277
429.53	411.32	373.57	306.66	294
<b>436.83</b>	<b>421.34</b>	<b>386.37</b>	<b>322.56</b>	<b>311</b>
<b>444.25</b>	<b>431.6</b>	<b>399.61</b>	<b>339.28</b>	<b>330</b>
<b>451.8</b>	<b>442.12</b>	<b>413.31</b>	<b>356.87</b>	<b>349</b>
459.48	452.89	427.47	375.37	370
<b>467.28</b>	<b>463.92</b>	<b>442.12</b>	<b>394.83</b>	<b>392</b>
<b>475.22</b>	<b>475.22</b>	<b>457.27</b>	<b>415.3</b>	<b>415</b>
<b>483.3</b>	<b>486.8</b>	<b>472.94</b>	<b>436.83</b>	<b>440</b>
<b>491.51</b>	<b>498.66</b>	<b>489.15</b>	<b>459.48</b>	<b>466</b>
<b>499.86</b>	<b>510.8</b>	<b>505.91</b>	<b>483.3</b>	<b>494</b>
<b>508.35</b>	<b>523.25</b>	<b>523.25</b>	<b>508.35</b>	<b>523</b>
<b>516.99</b>	<b>535.99</b>	<b>541.18</b>	<b>534.7</b>	<b>554</b>
<b>525.77</b>	<b>549.05</b>	<b>559.72</b>	<b>562.42</b>	<b>587</b>
<b>534.7</b>	<b>562.42</b>	<b>578.9</b>	<b>591.58</b>	<b>622</b>
<b>543.79</b>	<b>576.12</b>	<b>598.74</b>	<b>622.25</b>	<b>659</b>
<b>553.03</b>	<b>590.16</b>	<b>619.26</b>	<b>654.51</b>	<b>698</b>
<b>562.42</b>	<b>604.53</b>	<b>640.48</b>	<b>688.44</b>	<b>740</b>
571.98	619.26	662.43	724.13	784
<b>581.7</b>	<b>634.35</b>	<b>685.13</b>	<b>761.67</b>	<b>831</b>
591.58	649.8	708.61	801.15	880
<b>601.63</b>	<b>665.63</b>	<b>732.89</b>	<b>842.69</b>	<b>932</b>
<b>611.85</b>	<b>681.84</b>	<b>758.01</b>	<b>886.37</b>	<b>988</b>
<b>622</b>	<b>698</b>	<b>784</b>	<b>932</b>	<b>1046</b>

Fig. 4. Table of frequencies for the proportional projections of the main flute profile in *Parcours de l'Entité*. The bold-faced numbers show the discriminated frequencies, corresponding to the frequencies used in the main tempered profile (fifth column on right, above.)

frontation, there is no discussion about the position that the *listening* occupies in the space itself.

However, something very different transpires when one listens to sounds that are diffused through loudspeakers evenly placed around the audience. If, when listening to instrumental music, the listener localizes the sound and its physical source in an almost unconscious way, the potentiality offered by electroacoustic music, in which sounds permeate the air through displace-

ments, rotations, crossed stereophonies or spatial multiphonies, drastically inverts the situation. The extremely mobile sounds in space induce the listener to localize him- or herself in the space where the listening takes place. Confronted with the strong mobility of electroacoustic diffusion and surrounded by a whirlwind of sound, the listener localizes his or her merely pointillistic and even impotent presence in the face of the spatial/temporal dynamism of the electronically diffused sounds.

In short, if the listener localizes the sounds of instrumental origin through automatic and almost unconscious deduction, it is the spatial dynamism itself of the electroacoustic sounds that will localize that individual listener in the space through which the work is diffused.

The interaction between instrumental and electroacoustic means gives a *diagonal* dimension to the structural question around spatiality in music, in the sense that the space is not related exclusively to the stage or to the audience. Although the pure listening forms of music—purely instrumental or constituted by electroacoustic diffusion alone—conserve their pertinence [18], the dialectic between instrumental writing and electroacoustic structures makes possible the weaving of a transitional web between that which is localized through listening and that which localizes the listener through his or her hearing. In this way a kind of spatial continuum is established that diagonally “cuts” the perceptual auditory space.

Based on elaborated artifices of correspondence and opposition, of fusion and contrast between instrumental writing and electroacoustic structures—artifices that should be established by detailed work on musical material in its double function (constitutive and relational), for which the harmonic techniques explained here can be of great utility—such a diagonal dimension causes an emergence of interest in listening to mixed electronic and instrumental media, which cause one to respond to that which one hears by contrasting the question “to be or not to be” with the more predominant situation in contemporary listening: one substitutes the conjunction *or* with the conjunction *and*.

Although I have written about an illusion destroyed at each moment concerning a presumably undeniable unity of the perceived thing, the certainty of the non-conciliatory coexistence between the thing and its representation is transformed, in mixed electroacoustic music, into something else—into an advantageous, constant and at the same time nebulous illusion.

It is from this “auditory illusion” that, in part, my compositional poetics concerning mixed electroacoustic works are nourished, such as in the case of *Profils Écartelés*, *A Dialética da Praia*, *Parcours de l'Entité* or the most recent of these, *ATLAS* (1996–1997), for oboes, membrane percussion, quadraphonic tape and live electronics. In light of such compositions, the listener constantly wonders

First Contraction

Second Contraction

Third Contraction

Fourth Contraction

Normal Extension of the Profile = Tempered

11 16 8 9 1 5 21 10 14 19 12 4 17 21 1 5 18 10 15 8 24 13 17 9 25 14 6 23

Fig. 5. Directional expansion of the main profile in *Parcours de l'Entité*.

about the nature of what he or she hears, questioning whether it comes from instruments in performance or from pre-recorded, projected sound; whether I have dynamized the instrumental writing spatially, harmonically, temporally and timbristically or if instead the listener is faced with purely electroacoustic structures that were pre-elaborated in the studio and either derived from the instruments themselves or from other sources that are timbristically related to them.

The illusion, constantly transformed into doubt, induces the certainty that what *is* can also *not* be. And it is the future of such an illusion that, I believe, will dictate in the years to come the routes of the new poetics of electroacoustic music.

## References and Notes

1. The word "panaroma" was invented by James Joyce in *Finnegans Wake* (London: Faber and Faber, 1975) p. 143. Although it sounds like a typically Brazilian word originated from the *tupi* language, it actually demonstrates the international character of our studio through the symbol of Joycean complexity and multireferentiality. The Studio PANaroma achieved national and international stature through significant activities such as the CIMESP (International Electroacoustic Music Contest of São Paulo), the BIMESP (International Electroacoustic Music Biennial of São Paulo), the Panorama of Avant-Garde Music concert series and the Maximal Music

CD label. The Studio PANaroma is the only one in Brazil to take part in the Forum-IRCAM. In October 1996, Pierre Boulez visited the studio.

2. In addition to the writing cited in this text, see the following theoretical works of mine on electroacoustic music: *Luciano Berio et la Phonologie—Une Approche Jakobsonienne de son Oeuvre* (Frankfurt am Main/Berlin/New York/Paris/Vienna: Peter Lang Verlag, Publications Universitaires Européennes, Série XXXVI, Musicologie, Vol. 89, 1993); "Un Essai sur la Composition Verbale Électronique *Visage* de Luciano Berio," *Quaderni di Musica/Realtà* No. 30\* (Modena: Mucchi Editore, 1993); "Do Som do Tempo ao Tempo do Som," *Proceedings of the II SBC&M—Second Brazilian Symposium on Computer Music*, Fifteenth Congress of the Brazilian Computer Society, Canela—RS, pp. 228–231 (1995); "A Espacialidade na Música Eletroacústica," *ARTEunesp 11* (São Paulo: Editora da Unesp, 1995) pp. 53–61; *Música Eletroacústica—História e Estéticas* (São Paulo: Edusp, 1996); and "Atualidade Estética da Música Eletroacústica" (post-doctoral work presented at the State University of São Paulo-UNESP, in 1997).

3. Karlheinz Stockhausen, *Texte zur Musik 1970–1977*, Vol. 4 (Cologne: Verlag M. DuMont Schauberg, 1978) pp. 369–376.

4. Pierre Schaeffer, *Traité des Objets Musicaux—Essai Interdisciplinaires* (Paris: Éditions du Seuil, 1966) pp. 387–472.

5. Schaeffer [4] pp. 216–243.

6. Karlheinz Stockhausen, *Texte zur elektronischen und instrumentalen Musik*, Vol. 1 (Cologne: Verlag M. DuMont Schauberg, 1963) pp. 211–221.

7. This work, in its abbreviated version titled *A Viagem sobre os Grãos* (1996)—the premiere of which took place at Carnegie Hall in New York in April 1996—won the First Prize at the "XVIII Concorso Internazionale 'Luigi Russolo' di Musica

Elettroacustica" in Varese, Italy, in September 1996.

8. Schaeffer [4] pp. 548–555.

9. In 1995, I realized a new and temporally reduced version of this piece at the Studio PANaroma, titled *Words in Transgress*.

10. Edmund Husserl, *Phänomenologie des inneren Zeitbewusstseins* (1928), in E. Husserl, *Phänomenologie der Lebenswelt—Ausgewählte Texte II* (Stuttgart: Reclam Verlag, 1986) pp. 80–165.

11. See also Flo Menezes, texts (in Portuguese and English) about the compositions *Parcours de l'Entité*; *Contextures I* (*Hommage à Berio*); *Contexture III—Tempi Reali, Tempo Virtuale*; *PAN: Laceramento della Parola (Omaggio a Troskij)*; *Profils Écartelés*; and *Words in Transgress*; in the booklet of the CD *Música Maximalista—Maximal Music*, Vol. 1, São Paulo 1996.

12. The first theoretical exposition of the cyclic modules was published in Flo Menezes, *Apoteose de Schoenberg—Ensaio sobre os Arquétipos da Harmonia Contemporânea* (São Paulo: EDUSP/Nova Stella, 1987).

13. *Parcours de l'Entité* won the Prix Ars Electronica in Linz, Austria, in 1995.

14. The logarithmic law for the tempered scale is 12 2. For the calculation of the proportional projections, a special program for the Atari 1040 ST computer was conceived in 1987 in Germany by Marcel Schmidt, technician at the Cologne Studio für elektronische Musik. At the time of writing, I make the calculations for the projections through a patch that I wrote in collaboration with German composer Hans Tutschku using the program Patchwork (developed at IRCAM) for the Macintosh computer.

15. The sounds synthesized through the classic program Music V were realized in 1991 with the technical assistance of Andrea Provaglio when I was com-

poser in residence at the CSC (Centro di Sonologia Computazionale) at Padua University in Italy.

16. *Profils Écartelés* has represented the production of the Cologne Studio several times at festivals in Europe. In November 1993, the piece was awarded the International Composition Prize at TRIMALCA—Tribuna de Música para América Latina y el Caribe—in Mar del Plata, Argentina.

17. Umberto Eco, "Il Contributo di Jakobson alla Semiotica," in *Roman Jakobson* (Roma: Editori Riuniti, 1990) p. 290.

18. My own work also tends toward such less-hybrid solutions. In addition to the works already mentioned in this text, examples include the following: (1) purely electroacoustic pieces (without instruments): *Contextures I (Hommage à Berio)* (1988–1989), *Kontexturen II—Schachspiegel* (1989–1990), *La Ricerca Panica di Eco* (1991), *La (Dé)marche sur les Grains* (1993); (2) purely instrumental works: *Vertikale Augenblicke in Wien* (1989), *TransFormantes II* (1995), *Concenti—Sul Canto e il Bel Parlare* (1995–1996), *On the other hand . . .* (1997); (3) electroacoustic compositions with instrumentation: *Contesture III—Tempi Reali, Tempo Virtuale* (1990), *Contesture IV—Monteverdi Altrimenti* (1992–1993),

*Fenomeno di Massa* (1995–1997), *ATLAS—Foles e Peles* (1996–1997) and *TransFormantes III* (1997).

### Discography of Works by the Author

*Contesture IV—Monteverdi altrimenti*, in *Brasil! New Music!* Vol. 2 (São Paulo: Camerati, 1994). Interpretation: Grupo Novo Horizonte, directed by Graham Griffiths.

*Contextures I (Hommage à Berio)*, in *Nuova Officina Bolognese, January 1992 (la città incosciente)* (Bologna, Italy: Galleria Comunale d'Arte Moderna, 1991) compact disc ST.OSTI5.

*A Dialética da Praia*, in *Duo Diálogos—Contemporary Percussion Music from Brazil* (Brussels: GHA, 1995) compact disc GHA 126.033. Interpretation: Duo Diálogos de Percussão (Joaquim Abreu and Carlos Tarcha).

*Música Eletroacústica—História e Estéticas*, book and compact disc (São Paulo: EDUSP, 1996). Includes *La (Dé)marche sur les Grains* and *PAN: Laceramento della Parola (Omaggio a Trotskji)*.

*Música Maximalista—Maximal Music* Vol. 1, electroacoustic works realized in Germany, Italy and Brazil from 1986 to 1995 (São Paulo: Studio

PANaroma, 1996), compact disc. Flutes: Antonio Carlos Carrasqueira; percussion: Eduardo Ganesella. Includes *Parcours de l'Entité* (flutes: Antonio Carlos Carrasqueira; percussion: Eduardo Ganesella), *Contextures I (Hommage à Berio)*, *Contesture III—Tempi Reali, Tempo Virtuale* (pianos: Paulo Álvares), *PAN: Laceramento della Parola (Omaggio a Trotskji)*, *Profils Écartelés* (piano: Paulo Álvares) and *Words in Transgress*.

*Parcours de l'Entité*, in *Prix Ars Electronica 1995* (Linz, Austria: Oberösterreichischer Rundfunk, 1995), compact disc. Flutes: Isabelle Hureau; percussion: Thierry Miroglio.

*Profils Écartelés*, in *Brasil! New Music!* Vol. 2, compact disc (São Paulo: Camerati, 1994). Piano: Paulo Álvares.

*A Viagem sobre os Grãos*, in *XVIII Concorso Internazionale "Luigi Russolo" di Musica Elettroacustica*, compact disc (Italy, 1996). Interpretation: Duo Diálogos de Percussão (Joaquim Abreu and Carlos Tarcha).

---

Manuscript received 19 May 1997.