

Andrea Valle

A typological space for representing collections of sound objects

Proposal for EMS2007 - Leicester

1 Data

1.1 Name

Andrea Valle

1.2 Affiliation

DAMS - Department of Fine Arts, Music and Performing Arts

CIRMA - Centro Interdipartimentale di Ricerca sulla Multimedialità e l'Audiovisivo

Università di Torino (<http://www.cirma.unito.it>)

1.3 Addresses

Work

Andrea Valle

DAMS - Università degli Studi di Torino

via Sant'Ottavio 20

10124 - Torino

Italy

Home

Andrea Valle

via Lanzo 102

10073 - Ciriè (TO)

+39(0)11 921 10 16 - +39 349 55 47 343 (mob.)

Italy

1.4 E-mail

`andrea.valle@unito.it`

(`valle@di.unito.it`)

2 Abstract

A typological space for representing collections of sound objects

More than 40 years ago Pierre Schaeffer's *Traité des objets musicaux* (1966) proposed a way to think about the audible domain avoiding the simple shortcuts of a pure acoustic approach (what Schaeffer 1966: 416 called "physique amusante", referring to its previous attempts with A. Moles, see Schaeffer 1952). As the adjective "audible" refers simply to all what can be heard, Schaeffer's phenomenological approach led him, among the many other topics covered by his *Traité*, to articulate a theory both of listening practices and of sound objects. Concerning this last point, it is well known that Schaeffer's analytical observations in the *livres IV-V* of the *Traité* still remain unsurpassed for their insight. More, while phenomenology typically avoids a too strict formalization, Schaeffer's attitude, in this sense nearer to the (at the time) rising semiotics, results in a double-sided analytic device -the so-called "typo-morphologie"- which was intended as a multifaceted tool for the description of all the objects of the audible domain. In particular, "typology" is meant as the description of a sound object in relation with other objects (in its "contexte"), while "morphology" is intended as a description of the sound object *per se* (in its "contexture"). Thus, different epistemological assumptions can be retrieved on the two sides of the typo-morphology: while morphological criteria are defined as a set of (seven) analytical properties (i.e. parameters having different values) characterizing a sound object, typology offers on the other side a geometrical-topological description of the same object in terms of the position it occupies in a 2-dimensional space. While the morphological point of view has been widely reconsidered (starting from the seminal contribution by Smalley 1986, see also 1999), the idea of a typology as a geography of sound (a "cartographie du sonore potentiel", Risset 1999: 156) has never been consistently developed, a part from the definition of timbral spaces (Plomp 1976, Grey, see Pierce 1983, Wessel 1979, Slawson 1985) which are not intended to be so general as Schaeffer's typology and are mainly based on psycho-acoustic assumptions instead of phenomenological ones.

Knowing that "la recherche d'une typologie « absolue » est illusoire" (Schaeffer 1966: 433), the goal of this contribution is to redefine a typological space. Starting from Schaeffer's proposal, a typological space should be: i) continuous; ii) consistent; iii) usable in an intersubjective way. In the *Traité* the formalization operates a posteriori: first the six most relevant categories for sound description are identified ("masse", "variation", "durée", "entretien", "facture", "équilibre"), then they are tentatively combined in a 2-dimensional space for sake of simplicity ("dans le cadre d'une épure à deux dimensions", Schaeffer 1966: 436). Starting from the Schaefferian phenomenology but reversing the approach (i.e. paying attention primarily to formal consistency) a 3-dimensional (plus 1) space model can be proposed (Lombardo & Valle 2005, Valle 2006). In the model,

the space is defined by profile/sustain, calibre, variation and it is (at least formally) continuous. Classes representing sound objects can be defined as volumes partitioning the space. The two main improvements with respect to Schaeffer's typological space are the following:

- it is possible to differentiate sound objects belonging to the same class
- it is possible to define trajectories in the space representing transformations of sound material

In this typological space each sound object receives a unique definition in terms of a triple representing its position. The space is intended as a reference frame for a phenomenological mark-up of sound objects. Due to its typological nature, it is particularly well-fitted for the annotation of sound object collections. The annotation process is operated by human subjects assigning a position in the space to each sound object. This means that a quantification of the axes must be provided. As they are not related to any physical dimension, the measurement units are *-in se-* totally arbitrary, but the intersubjectivity of measurement assures a form of objectivity: the practice of annotation has its model not in physical measurement but in human based evaluation of specific domains. The actual implementation, named *Typologus*, is a GUI-based software where the user can input and listen to audiofiles, annotate them, and visualize/edit their position in the space. Chosen mark-up format is xml-based: while assuring human readability, xml allows easy automatic data processing. Thus, the annotation process ends in an xml file which can then be used to automatically produce data visualization and documentation (using scriptable 3-D visualization and documentation softwares). The proposed typological space still needs to be refined. But, through its implementations, it already allows an explorative approach to sound description. As an example, it can be used to implement "sonic browsers" (Brazil, Fernström, Ottaviani 2003) for simulative approaches to analysis and sound design.

A typological space is relevant for soundscape and multimedia/audiovisual domains, where there is an increasing need for analysis/classification tools of large collections of sound objects. But also in music analysis it can lead to identify trajectories and subspaces peculiar to specific musical *corpora*. In order to provide an example, an analysis of Edgar Varèse's *Poème électronique* will be discussed. In particular, the analysed audio material comes from the VEP project (Lombardo *et al.* 2005, 2006), which reconstructed using virtual reality and binaural audio techniques the entire show (audio and video) which took place in the Philips Pavilion at the 1958 Brussels Expo. The music material is the unpublished original 3 track version prepared for the show by Varèse and the technician Willem Tak (Dobson *et al.* 2005). Each of the tracks develops as a chain of blocks of autonomous sound objects separated by silences: the tracks were in fact intended as three parallel strata of sound material prepared according to the Varèsian principle of

the “sensation of non-blending” (Varèse 1971: 26). Because of the downmixing process from the 3-track version, this chain-structure has become much more ambiguous in the commercially available 2-track stereo version: but in its original form it offers the possibility of studying through the typological space the way the “sound” is “organised” by Varèse.

References

- Brazil, E., Fernström, M. and Ottaviani, L.
2003: “Psychoacoustic validation and cataloguing of sonic objects: 2D browsing”, in Rocchesso e Fontana 2003 (see), 297-339.
- Emmerson, S.
1986: (ed.) *The Language of Electroacoustic Music*, London, MacMillan.
- Dobson, R., Fitch, J., Tazelaar, K., Valle, A., Lombardo, V.
2005: “Varèse’s *Poème électronique* regained: evidence from the VEP project”, *Proceedings of International Computer Music Conference 2006*, 29-35, Barcelona.
- Lombardo, V., Valle, A.
2005: *Audio e multimedia*, Milano, Apogeo, 2nd ed.
- Lombardo, V., Valle, A., Nunnari, F., Giordana, F., Arghinenti, A.
2006: *Archeology of Multimedia, Proceedings of the 14th International ACM Conference on Multimedia 2006*, 269-268.
- Lombardo, V., Arghinenti, A., Nunnari, F., Valle, A., Fitch, J., Dobson, R., Padget, J., Tazelaar, K., Weinzierl, S., Benser, S., Kersten, S., Starosolski, R., Borczyk, W., Pytlik, W., Niedbała, S.
2005: “The Virtual Electronic Poem (VEP) project”, *Proceedings of International Computer Music Conference 2006*, 451-454, Barcelona.
- Pierce, J. R.
1983: *The Science of Musical Sound*, New York, Freeman.
- Plomp, Reinier
1976: *Aspects of Tone Sensation. A Psychophysical Study*, London, Academic Press.
- Risset, J.-C.
1999: “Pierre Schaeffer: recherché et creation musicales et radiophoniques”, in Thomas 1999 (see), 153-159.
- Roads, C. and Strawn, J.
1985: (eds.) *Foundations of Computer Music*, Cambridge (Mass.)-London, The MIT Press.
- Rocchesso, D. and Fontana, F.
2003: *The Sounding Object*, Firenze, Edizioni di Mondo Estremo.
(<http://www.soundobjects.org/SObBook>).
- Schaeffer, P.
1952: *A la recherche de la musique concrète*, Paris, Seuil.

1966: *Traité des objets musicaux*, Paris, Seuil.

Slawson, W.

1985: *Sound Color*, Berkeley-Los Angeles-London, California University Press.

Smalley, D.

1986: "Spectromorphology and Structuring Process", in Emmerson 1986 (see), 61-93.

1999: "Établissement de cadres relationnels pour l'analyse de la musique postschaefférienne", in Thomas

1999 (see): 177-213.

Thomas, J.-C.

1999: (ed.) *Ouir, entendre, écouter, comprendre après Schaeffer*, Bryn-sur-Marne-Paris, INA-Buchet/Chastel.

Valle, A.

"A topological model for a typological space", Symposium International sur les Sciences du Langage Musical-SLM 3, Bologna, SSSUB, 23-25/02/2006.

Varèse, Edgard

1971: "The Liberation of Sound", in Boretz, B. and Cone, E. T. (eds.), *Perspectives on American Composers*, New York, Norton, 25-33.

Wessel, D.

1979: "Timbre Space as a Musical Control Structure", *Computer Music Journal*, 3:2 (in Roads & Strawn 1985 (see), 640-657).

3 Curriculum vitae

(see attachment)

4 Short biography

Andrea Valle (04/11/1974) is actually researcher at the Department of Fine Arts, Music and Performing Arts of the University of Turin, where he teaches computer music, semiotics and analysis of audiovisual texts. He gained a degree in Sciences of Communication at the University of Turin, discussing a thesis on contemporary musical notation, and a Ph.D. in Semiotics at the University of Bologna, with a thesis dedicated to the relation between semiotics and perception in the audible domain. He is a member of the VEP project (<http://edu.vrmp.it/vep/>), dedicated to the reconstruction in virtual reality and binaural audio of the *Poème électronique* by Le Corbusier, Varèse, Xenakis. He is the author of three books (dedicated to musical notation, computer music, audiovisual analysis). He has studied composition with A. Ruo Rui, A. Corghi, M. Bonifacio and attended masterclasses by T. Wishart and M. Stroppa. He composes both instrumental and electroacoustic music, preferring an algorithmic approach.